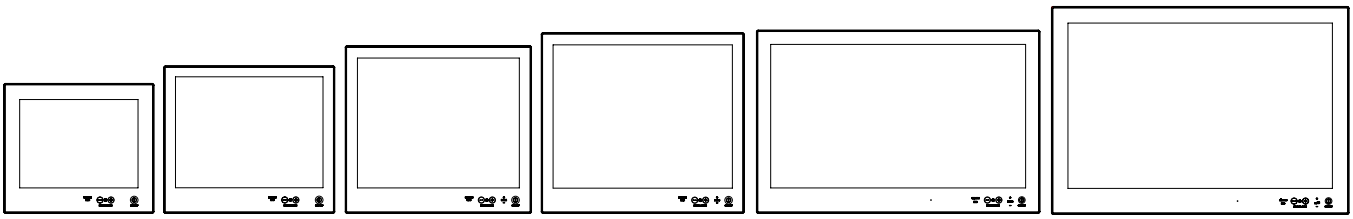
HATTELAND®
DISPLAY

USER MANUAL



Series X - Maritime Multi Computer (MMC) Models

HD 12T21 MMC-xxx-xxxx - 12.1 inch Maritime Multi Computer
HD 15T21 MMC-xxx-xxxx - 15.0 inch Maritime Multi Computer
HD 17T21 MxC-xxx-xxxx - 17.0 inch Maritime Multi Computer
HD 19T21 MxC-xxx-xxxx - 19.0 inch Maritime Multi Computer
HD 24T21 MxC-xxx-xxxx - 24.0 inch Maritime Multi Computer
HD 26T21 MxC-xxx-xxxx - 25.54 inch Maritime Multi Computer (preliminary)

(MxC, where x is either; M=Standard (MMC), E=ECDIS Calibrated (MEC))

User Manual MMC Series X	
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Please visit www.hatteland-display.com for the latest electronic version of this manual.

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WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Last revised 9 Nov 2012

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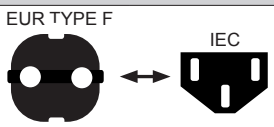
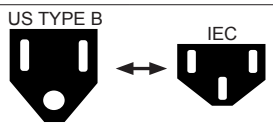
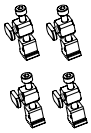
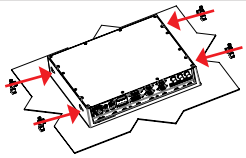
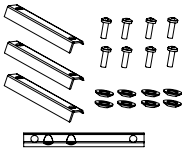
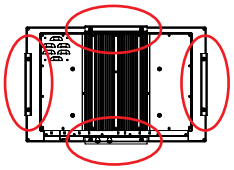
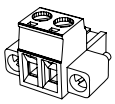
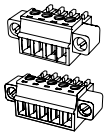
Contents of package

Note: Entries listed below are for Standard factory shipments. Customized factory shipments may deviate from this list.

Item	Description	Illustration
FS-CABLE EU	1 pcs of power cable European Type F “Schuko” to IEC. Length 1.8m	
80099	1 pcs of power cable US Type B plug to IEC. Length 1.8m	
MEDIA STD01	Documentation and Driver DVD for factory installed components like mainboard, IDE, network etc. It also includes the Touch Screen driver for units delivered with a factory mounted touch screen. For most recent drivers, please visit “www.hatteland-display.com/archive”. Note: To use this DVD disc you will need an external USB CD/DVD drive or provide means of getting contents copied over via USB memory stick/network to MMC unit. In some cases (due to revisions) a provisonal CD (PRO02-xxx) may be delivered with the unit instead.	Menu browser for Microsoft® Windows® Operating Systems
	Recovery Image (located on hidden partition on SSD) Note: Only applicable for factory delivered units with SSD hardware.	
	Test Report	
 HD CMB SX1-A1	Model dependent: 4 pcs of Key Hole Mounting Brackets for Console/Panel Mounting, Anodized Aluminium/Stainless Steel. Suitable for panel thickness 3.0mm to 10.0mm. This bracket kit is suitable for 12, 15, 17 and 19 inch units.	
 HD CMB SX1-B1 or HD CMB SX1-C1	Model dependent: Bracket Kit suitable for console/panel mounting which contains: 3 x Mounting Bracket for top, left and right side 1 x Mounting Bracket for bottom side (terminal/connector plate area) 8 x M5x16 screws 8 x C-Washers HD CMB SX1-B1 = Suitable only for 24 inch units. HD CMB SX1-C1 = Suitable only for 26 inch units.	
 Terminal Block Connector Kit	Terminal Block Connector Kit as follows (may in some cases be already factory mounted): 1 x 2-pin Terminal Block 5.08 (Phoenix 1805301) for DC Power In Refer to “Configuring Housing / Terminal Block Connector” section for usage.	

Package may also include: (based on accessories/options ordered)

Item	Description	Illustration
 Terminal Block Connector Kit	Depending on factory mounted options, Terminal Bracket Connector kit as follows: 4 x 5-pin Terminal Block 3.81 (Phoenix 1827732) for RS-422 / RS-485 NMEA COM (PCA100293-1) 4 x 4-pin Terminal Block 3.81 (Weidmüller 1792970000) for CAN Interface (HT 00254 OPT-A1) 4 x 4-pin Terminal Block 3.81 (Phoenix 1827732) for Digital Input/Output (HT 00268 OPT-A1)	Note: Location of module(s) may differ between unit sizes

General

About this manual

The manual contains electrical, mechanical and input/output signal specifications. All specifications in this manual, due to manufacturing, new revisions and approvals, are subject to change without notice. However, the last update and revision of this manual are shown both on the frontpage and also in the “Revision History” chapter at the end of the manual.

Furthermore, for third party datasheet and user manuals, please see dedicated Documentation and Driver DVD delivered with the product or contact our sales/technical/helpdesk personnel for support.

About Hatteland Display

Hatteland Display is the leading technology provider of specialized display and computer products, delivering high quality, unique and customized solutions to the international maritime, naval and industrial markets.

The company represents innovation and quality to the system integrators world wide. Effective quality assurance and investment in sophisticated in-house manufacturing methods and facilities enable us to deliver Type Approved and Mil tested products. Our customer oriented approach, technical knowledge and dedication to R&D, makes us a trusted and preferred supplier of approved solutions, which are backed up by a strong service network.

www.hatteland-display.com

You will find our website full of useful information to help you make an informed choice as to the right product for your needs. You will find detailed product descriptions and specifications for the entire range on Displays, Computers and Panel Computers, Military solutions as well as the range of supporting accessories. The site carries a wealth of information regarding our product testing and approvals in addition to company contact information for our various offices around the world, the global service centers and the technical help desk, all ensuring the best possible support wherever you, or your vessel, may be in the world.

Contact Information

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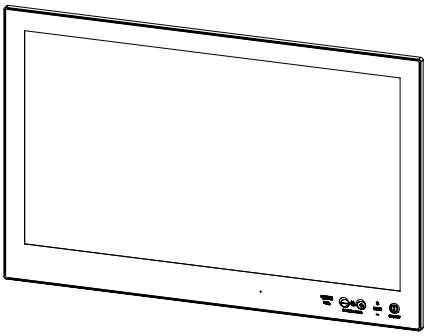
Sales office, Oslo / Norway: Solbråveien 20 N-1383 Asker Norway Tel: +47 4814 2200 Fax: +47 5276 5444	**Sales office, Aix-en-Provence / France:** Hatteland Display SAS ACTIMART, 1140 RUE AMPERE, BP 50 196 13795 AIX-EN-PROVENCE, CEDEX 3 France Tel: +33 (0) 4 42 16 47 57 Fax: +33 (0) 4 42 16 47 00
Sales office, San Diego / USA: Hatteland Display Inc. 11440 W. Bernardo Court, Suite 300 San Diego, CA 92127, USA Tel: +1 858 753 1959 Fax: +1 858-408-1834	

For an up-2-date list, please visit www.hatteland-display.com/locations

Maritime Multi Computer (MMC) - Introduction



As a leading manufacturer of display and computer hardware for the maritime segment, Hatteland Display continuously gauges and responds to market needs. Our commitment to develop specialized products for a multitude of onboard ship systems continues, and with that the introduction now of a brand new product range called, Series X.

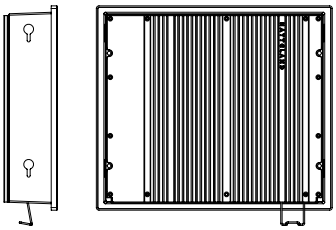
With cast aluminium, compact and sleek by design chassis, the units from this new range can be desk mount or console integrated. The design is modular, allowing for common modules to be used in various models and combinations. Together these design features bring about a range perfectly in synch to market cost expectations - along with that, the performance and type approval always expected in all Hatteland Display products.

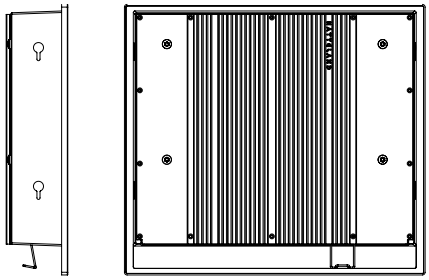
The modules used in Series X, are all qualified having undergone and passed our extensive test program, which includes HALT testing. This means that the products are tested well outside the requirements in EN60945 and E10. The result is a more reliable product.

The Series X MMC range of products has been developed alongside the display versions, thus expanding the impressive footprint and impact of this Series X on the maritime market.

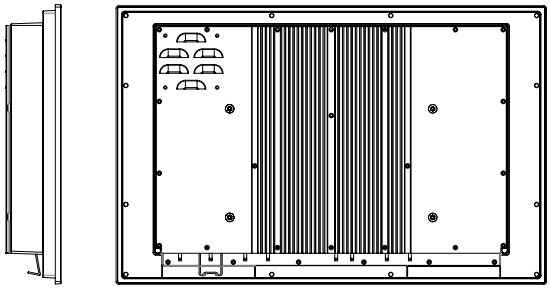
The considerable advances made by Hatteland Display over recent years in PC platform development is now enhancing further the panel PC offering. All Series X display sizes are available with state of the art PC technology integrated, designed and built for type approved maritime systems.

A computer and display, all in one...





- MULTITOUCH
- Type Approved
- ECDIS Compliant
- IP22 rear / IP66 front
- Superior Bonding Technology
- Module based, tailor-made systems made easy!
- Sunlight Readable / High Bright versions available
- GLASS DISPLAY CONTROL™ (GDC), Solid State Menu System



Introduction to products with touch screen

Nearly all of our Series X products with touch screen uses Projected Capacitive Touch screen (PCTS), widely used with great success on mobile phones and typical pad devices. PCTS can be equally effective also for marine applications. One of the advantages of PCTS is that it has features seen in both resistive and surface capacitive touch screen technologies.

Multitouch is defined as the ability to recognize two or more simultaneous touch points. Using projected capacitive technology lets us create a more intuitive form of human-device interaction. Touch interface gestures, supported by projected capacitive sensors, can simplify the interface and provide an intuitive user experience that goes beyond the typical "button replacement" found in most simple touch interfaces.

Please review the appropriate Product Data Sheet (in this manual) to determine if PCTS are supported.

The technical benefits of PCT are:
- Very good optical performance (same as surface capacitive)

- Environmentally strong, the touch sensor is inside the product (better than both surface capacitive and resistive)

- Supports Multitouch (Newer Operating System (OS) required/dependent, see next page for info, section "*Note")

- Strong against rain / drip

- Excellent readability - light transmission of up to 91% through a standard sensor

- Stability - no drift, therefore no recalibration is required

- Pointing device - works with gloved and ungloved finger

- Resistance to contamination - by harsh cleaning fluids and other noxious substances

- Communicates via USB to external computer or internally

Main usability, performance and integration characteristics are:

Technology	Optical Performance	Stable Calibration	Gloves	Water	Durability	Price	Multitouch	Frameless Design
Analog Resisitive	- -	+	+ +	+ +	-	+ +	-	-
Surface Capacitive	+ +	-	- -	-	+	-	-	-
Projected Capacitive*	+ +	+ +	+	+	+ +	-	+ +	+ +

*Used for all Hatteland Display standard Series X Touch Screen products.
Note: 26 inch and/or customized solutions may use "Analog" or "Surface" resistive/capactive technology instead, please review datasheet.

Touch Screen Drivers and Documentation

All units are shipped with a Documentation and Drivers DVD or CD which contains suitable drivers* for touch screens. (Named MEDIA STD01).

You can also visit our website www.hatteland-display.com to view the same list (or even recently new added products) for our models with touch screen.

Before using the touch screen, it should be calibrated for your system. Please install the 3rd party software* and use the Calibrate function.

For additional touch controller/screen documentation and updated drivers*, please visit the 3rd party manufacturer website as found in the Touch Screen Wizard CD menu.

***Note:**
Newer Operating Systems (OS), from year 2011 and above, does not specifically require additional 3rd party drivers in order to operate the touch screen and support “Multitouch”. For example; Microsoft® Windows® 7 and above comes with default factory installed Windows HID drivers fully supporting “Multitouch”. You may choose to install 3rd party drivers for example during trouble-shooting situations or to review features of the 3rd party software. Hatteland Display suggests that you should use factory default Microsoft® Windows® 7 HID touch drivers in any case possible.

For older Operating Systems (like Microsoft® Windows® XP and older), before year 2011, the OS does not/may not support “Multitouch” technology and the touch screen will just operate as a ordinary single-point touch screen. Additionally to get touch screen working at all in older OS, you need to install 3rd party drivers.

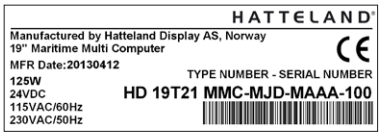
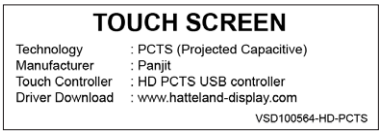
Note that the lack of “Multitouch” support is not dependent on hardware or software/firmware for the controller, but rather dependent on important core functions in the Operating System which is outside control of the 3rd party software.

Product Labeling

Introduction

This section details the locations, content details and specifications for factory mounted labels for all currently available standard Hatteland Display Panel Computer (MMC) models. This information will in most cases also apply for most Customized Models as well, but may differ based on customer requirements, in that case, please refer to the customized User Manual (paper or electronic version, dependent on customer requirements).

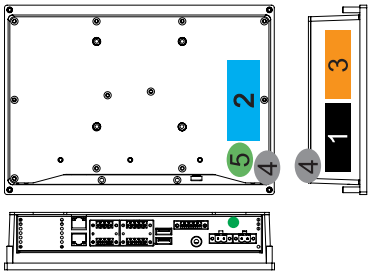
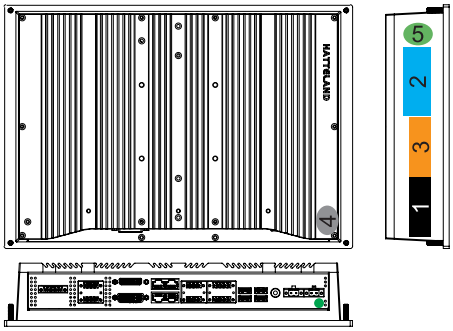
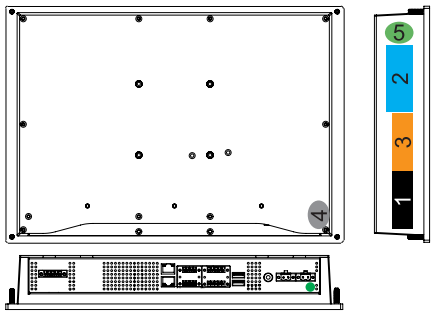
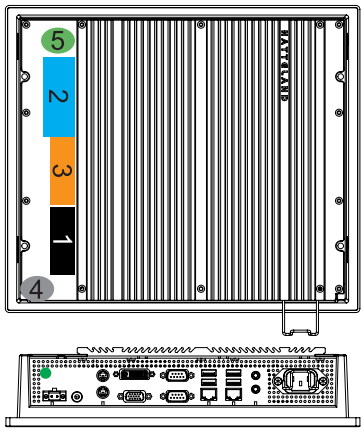
Label Size and Types

ID	Label Layout	Description	Specification
1		**Type : Serial Number Label** **Name** : Label B **Size** : 60mm wide x 22mm high (rectangle size) Note: Text content of label will match specifications derived from Data Sheet.	Silver with glue on back, non-tearable and made for thermal transfer printing.
		Barcode type: CODE128 (used extensively world wide in shipping and packaging industries. The symbology was formerly defined as ISO/IEC 15417:2007.)	
2		**Type : Operating System (OS) label.** Microsoft® Windows® Embedded Enterprise only. **Size** : 70mm wide x 28mm high (rectangle size) Note: Label only present if OS was part of factory option order. Linux OS does not have any label.	As per delivered from supplier.
3		**Type : Touch Screen Label** **Name** : Label B **Size** : 60mm wide x 22mm high (rectangle size) Note: Only present if Touch Screen was part of factory option order. Text content of label will vary depending on touch screen technology used.	Silver with glue on back, non-tearable and made for thermal transfer printing.
4		**Type : Warranty Label** **Size** : 30mm wide x 23mm high (oval size)	Tampering proof sticker with glue on back.
5		**Type : Quality Control (QC) Label** **Size** : 30mm wide x 23mm high (oval size)	Ordinary sticker with glue on back.
N/A	As shown (green dot, no text)	**Type : Product Tested OK in Production Label** **Size** : 10mm (circle in diameter) Note: Located on Terminal/Connector metal plate, near Power Input/Output connectors.	Ordinary sticker with glue on back.

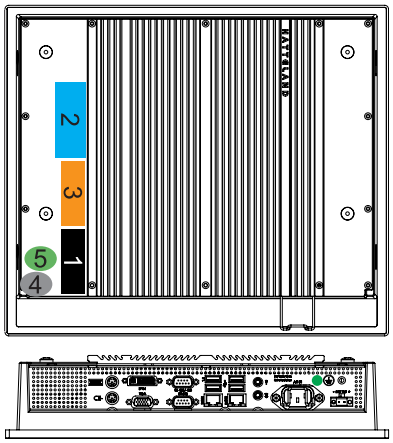
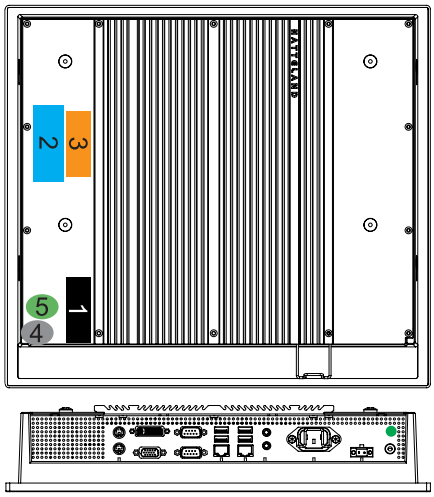
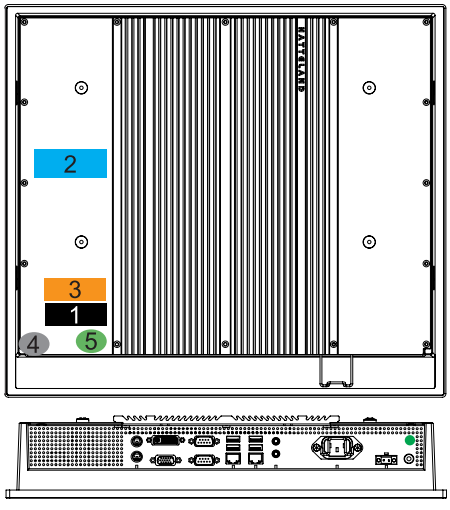
Product Labeling

Label Locations

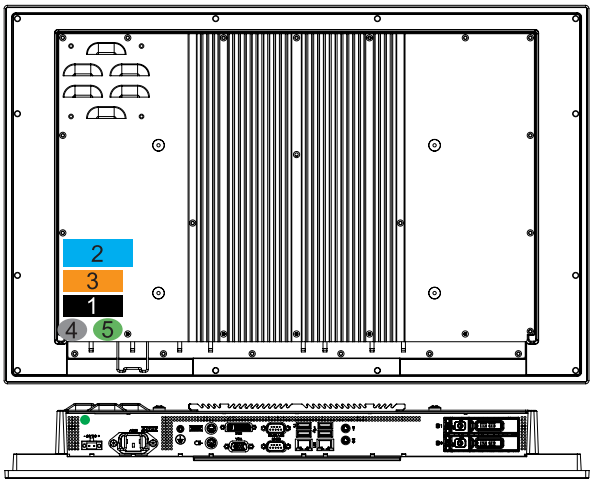
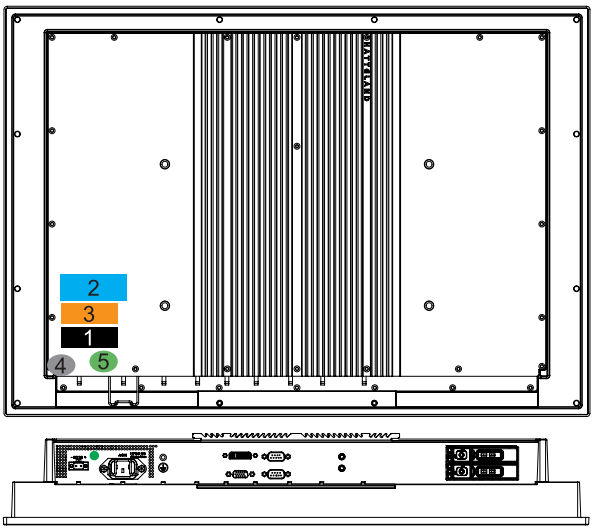
Number ID and coloring based on “Label Size and Types“ table from previous page. All illustrations below is seen from rear (and side where needed) with connectors facing down. Actual labels regarding its size and text orientation vs product size is drawn in. Due to space restrictions on selected units, some labels will be rotated 90 degrees to fit properly. The arrangement of labels may be shifted/stacked differently as it is based on factory options, such as; Touch Screen and Operating System (OS), but they will be grouped together where possible.

Label Positions	Notes	Applies for Product Range
	Warranty label covers both screw and bends over edge (rear/side). Labels placed on rear and side.	**HD 08T21 MMC-xxx-xxxx**
	Warranty label covers screw. Labels placed on rear and side.	**HD 13T21 MMC-xxx-xxxx** Intel® Core™2 Duo CPU
	Warranty label covers screw. Labels placed on rear and side.	**HD 13T21 MMC-xxx-xxxx** Intel® Atom™ CPU
	Warranty label covers screw. Labels placed on rear.	**HD 12T21 MMC-xxx-xxxx**

Product Labeling

	Warranty label covers screw. Labels placed on rear.	**HD 15T21 MMC-xxx-xxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 17T21 MxC-xxx-xxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 19T21 MxC-xxx-xxxx**

Product Labeling

	Warranty label covers screw. Labels placed on rear.	**HD 24T21 MxC-xxx-xxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 26T21 MxC-xxx-xxxx**

Product Labeling

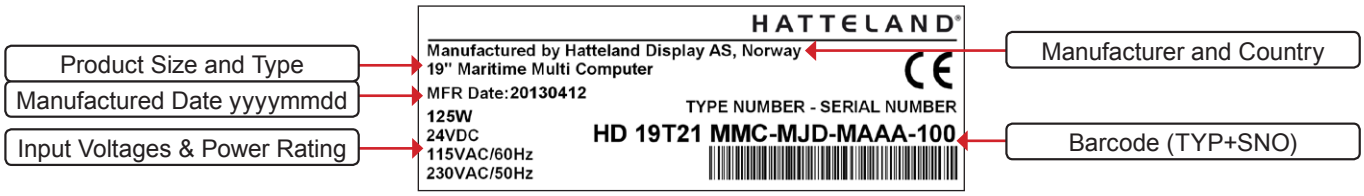
Warranty Label

If you are to perform service on a unit still under warranty, any warranty will be void if this label show signs of removal attempts (re-gluing) or removed completely. This label is located on the back of the product and covers a key screw. This is to aid service departments to determine if there has been any unauthorized service on a unit still under warranty.

Quality Control (QC) Label

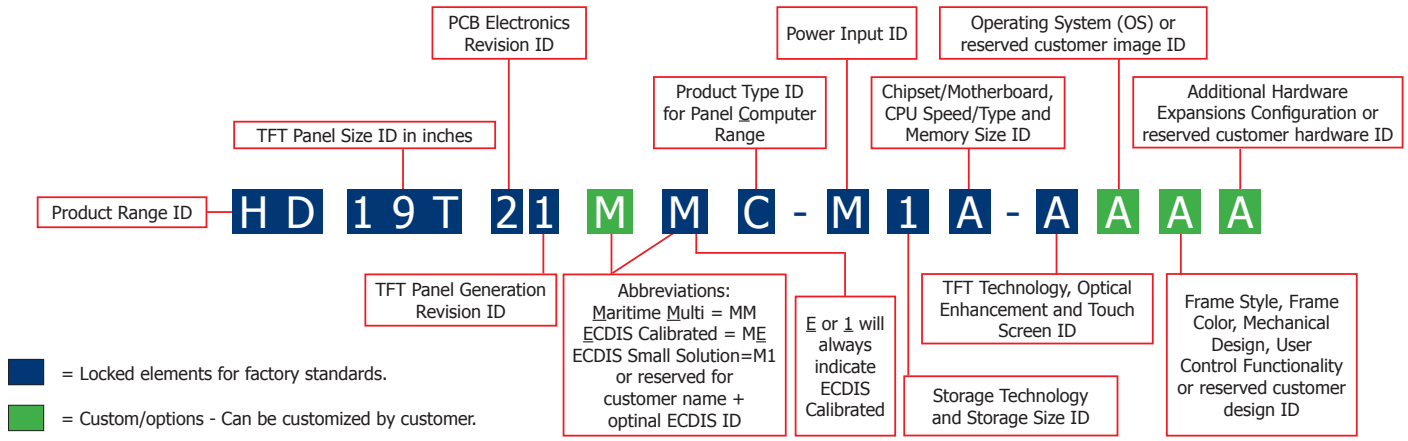
This label indicates that the unit is produced, tested and packed according to manufacturer's QA specifications. It will include a Personal ID and signature by the personnell responsible for approving the unit in production, test and warehouse departments.

Serial Number Label Layout (example)



Typenumber Structure (example)

Type Number shown below may not match your actual unit, but structure ID description applies for the entire product range. Reference: http://www.hatteland-display.com/pdflink/ind100780-4.php


PCB Electronics Revision ID
Power Input ID
Operating System (OS) or reserved customer image ID
Product Type ID for Panel Computer Range
Chipset/Motherboard, CPU Speed/Type and Memory Size ID
Additional Hardware Expansions Configuration or reserved customer hardware ID
TFT Panel Size ID in inches
Product Range ID
H D 1 9 T 2 1 M M C - M 1 A - A A A A
TFT Panel Generation Revision ID
Abbreviations: Maritime Multi = MM ECDIS Calibrated = ME ECDIS Small Solution=M1 or reserved for customer name + optinal ECDIS ID
E or 1 will always indicate ECDIS Calibrated
TFT Technology, Optical Enhancement and Touch Screen ID
Storage Technology and Storage Size ID
Frame Style, Frame Color, Mechanical Design, User Control Functionality or reserved customer design ID
= Locked elements for factory standards.
= Custom/options - Can be customized by customer.

Installation

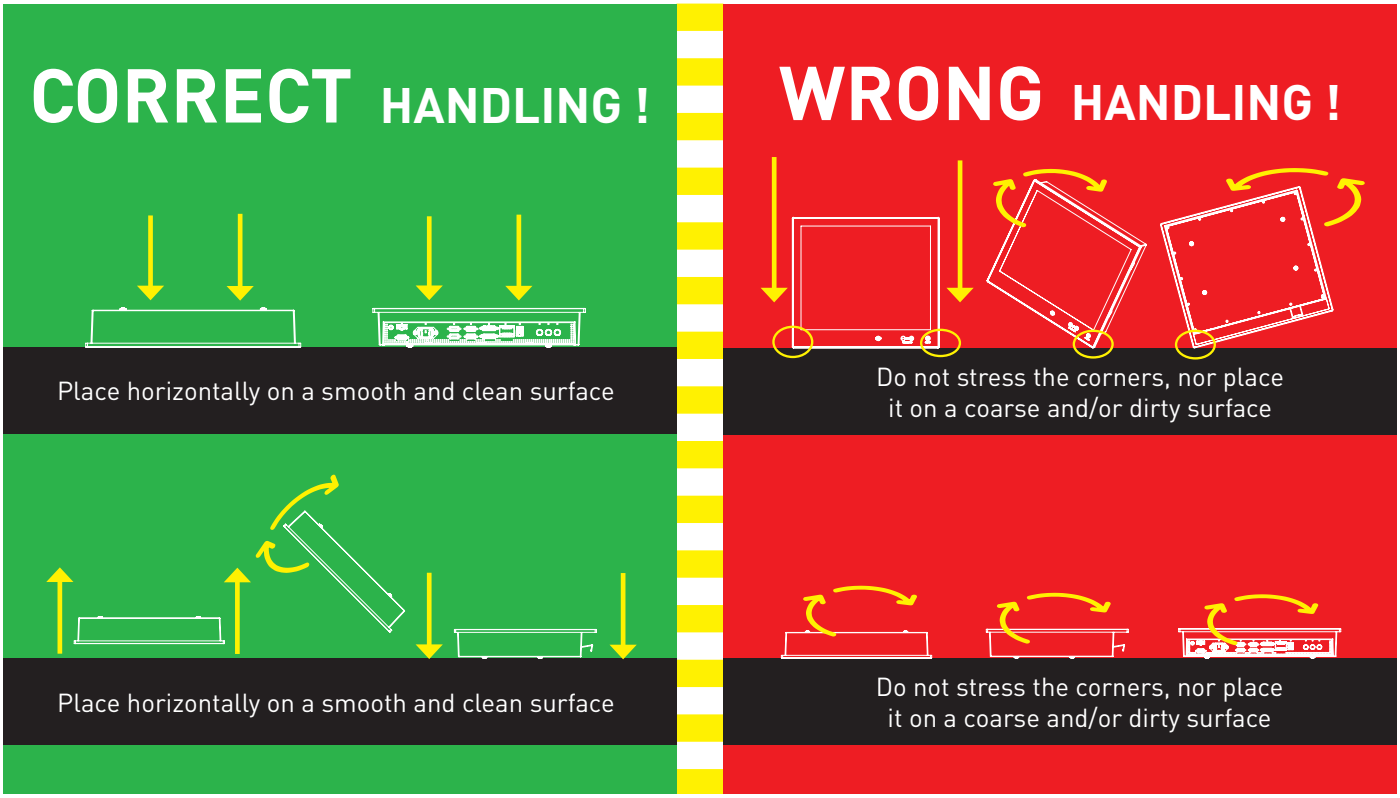
General Installation Recommendations

First Things First!

ATTENTION!

IND100148-5 - Rev 02

To prevent damage to chassis and glass, please review the illustrations below before handling units.


CORRECT HANDLING !
WRONG HANDLING !
Place horizontally on a smooth and clean surface
Do not stress the corners, nor place it on a coarse and/or dirty surface
Place horizontally on a smooth and clean surface
Do not stress the corners, nor place it on a coarse and/or dirty surface

Installation and mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall, console mounting etc.); for details, please see the relevant mechanical drawings.

2. Adequate ventilation is a necessary prerequisite for the life of the product. The air inlet and outlet openings must definitely be kept clear; coverings which restrict ventilation are not permissible.

3. Generally, do not install the unit in a horizontal position (laying down), as this will cause heat to build up inside the unit which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (±30 degrees) to improve the airflow through the unit.

4. To further improve the thermal situation we recommend to use forced air passing by the product. In some cases, convection based cooling can create “heat zones” around the product. This may be required in high temperature applications and also when there is reason to expect temperature problems due to non-optimal way of mounting.

5. Exposure to extreme direct sunlight can cause a considerable increase in the temperature of the unit, and might under certain circumstances lead to overtemperature. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)

6. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.

7. If the push buttons of the product are not illuminated, an external, dimmable illumination (IEC 60945 Ed. 4, 4.2.2.3, e.g. Goose neck light) is required for navigational use. The illumination shall be dazzle-free and adjustable to extinction.

8. Information about necessary pull-relievers for cables is indicated in the Physical Connection section of this manual. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.

9. Do not paint the product. The surface treatment influences on the excess heat transfer. Painting, labels or other surface treatments that differ from the factory default, might cause overheating.

10. Expose to heavy vibration and acoustic noise might under certain circumstances affect functionality and expected lifetime. This must be considered during system assembly and installation. Mounting position must carefully be selected to avoid any exposure of amplified vibration.

Installation limitations

Due to environmental factors, please review the points noted below.

A: Overheat prevention:

For Maritime Multi Computer (MMC, Panel Computers) it is advised that you do not mount the unit in a vertical angle lower than ±30 degrees, as noted in point 3 (previous section), i.e. flat mounting of the unit. This is to prevent both overheating the unit as well as ensure proper cooling airflow to sustain long-life and stable operation. Panel Computer units generate more heat than regular Display units naturally because of CPU and mainboard chips.

It should be noted that 24” and 26” MMC units have internal fans providing additional cooling airflow of their own, whilst smaller units (typically 8” to 19”) has no internal fans. In such cases, the ±30 vertical angle may in certain situations allow for lower angle mounting provided that the console casing has adequate cooling (see point D), however this is suggested as a trouble-shooting tip during installation or during short-term observer use if found suitable. It should not be considered as a defintive trusted solution.

B: Glass Display Control™ (GDC) front glass touch buttons:

As this uses Projected Capacitive technology (instead of conventional hard physical buttons and knobs), the touch controller can react and are sensitive to raindrops (for outdoor installations). To ensure that raindrops do not stay on the unit’s flat glass surface, please do not mount the unit in a vertical angle lower than ±30 degrees, i.e. flat mounting of the unit. This is to prevent accidental touches that are similar to a human finger (cover area for a x period of seconds) as well as make sure the raindrops are “moving” and slides down off the glass surface.

For Maritime Multi Display / Industrial Standard Display (MMD/STD) units (not Panel Computer units) the angle could potentionally be lower as the On Screen Display (OSD) menu offers a “OSD Key Outdoor” function with 5 seconds delay before activation on front glass functions. Please review the “OSD Menu Functions” to learn more. In certain situations this might help, but is only suggested as a trouble-shooting tip during installation or during short-term observer use if found suitable. It should not be considered as a defintive trusted solution.

C: Projected Capacitive Technology (PCTouch) MULTITOUCH and in general Touch Screen glass:

For all units with a factory mounted touch screen and for outdoor use especially, please review point B above regarding staying raindrops. Only solution to this situation is not to mount the unit in a vertical angle lower than ±30 degrees, i.e. flat mounting of the unit to ensure touch screen is not activated and accidentally automatically chooses functions in your running chart, radar or other software installed.

D: General rule for console mounted units:

To ensure proper cooling airflow, long-life and stable operation for all units, please make sure that the console casing have either fans or decent ventilation holes to prevent overheating inside the console due to the combined temperature of both Display or Panel Computer units together with other electronic instruments. A general rule is to make sure the console casing is capable of expelling “worst case scenario” in respect of the “Max Power Consumption” of all devices installed. Please review also point 2, 5, 6 and 9 (previous section) for additional information and installation tips.

Note that 24” and 26” Panel Computer units have their own internal fans. See point A for more information.

General mounting instructions

1. The useful life of the components of all Electronics Units generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated and kept at a suitable temperature in order to prevent the formation of condensation inside the display unit.

2. With most Electronic Units, cooling takes place via the surface of the casing. The cooling must not be impaired by partial covering of the unit or by installation of the unit in a confined cabinet.

3. In the area of the wheel house, the distance of each electronics unit from the magnetic standard compass or the magnetic steering compass must not be less than the permitted magnetic protection distance. This distance is measured from the centre of the magnetic system of the compass to the nearest point on the corresponding unit concerned.

4. Units which are to be used on the bridge wing must be installed inside the “wing control console” protected against the weather. In order to avoid misting of the viewing screen, a 25 ... 50 W console-heating (power depending on the volume) is recommended.

5. When selecting the site of a display unit, the maximum cable lengths have to be considered.

6. When a product is being installed, the surface base or bulkhead must be checked to ensure that it is flat in order to avoid twisting of the unit when the fixing screws are tightened, because such twisting would impair mechanical functions. Any unevenness should be compensated for by means of spacing-washers.

7. The product should be properly grounded, a shorter and thicker cable gives better grounding. A 6mm² is recommended, but a 4mm² or even 2.5mm² can be used for this purpose.

8. Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.

9. The classification is only valid for approved mounting brackets provided by Hatteland Display. The unit shall be mounted stand-alone without any devices or loose parts placed at or nearby the unit. Any other type of mounting might require test and re-classification.

General Installation Recommendations

Ergonomics

1. The front surface of the display glass has an anti-reflective (AR) coating which can be scratched and damaged with improper cleaning. It is recommended to use only 90+% pure Isopropyl alcohol (Isopropanol) and a soft fabric cloth for this first cleaning. Fold a cloth into a small pad, dampen the cloth with alcohol, and wipe the glass from one edge to the other in one direction with one continuous motion. The product glass will require cleaning as needed. The soft cloth & alcohol wipe is recommended to clean fingerprints and oils off the glass. Water stains (including coffee, tea & coke) should be first cleaned off the glass with a soft fabric cloth wet with water, immediately followed with wiping using an alcohol wetted cloth.

2. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.

3. Adjust screen inclination to remain gaze angle to the centre of the screen approximately perpendicular to the line of gaze.

4. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favourable.

5. The brightness of displays is limited. Sunlight passing directly through the bridge windows - or its reflection - which falls upon the screen workplaces must be reduced by suitable means (negatively inclined window surfaces, venetian blinds, distance from the windows, dark colouring of the deckhead). However, units can be offered with optical enhanced technology and/or High Bright panels to reduce reflections and are viewable in direct sun light, but as a general rule the units at the bridge wing area is recommended to be installed or mounted by suitable alignment or bulkhead / deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.

6. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets, for example).

7. For ECDIS applications, the minimum recommended viewing distance are as follows:
   (IEC62288, Part 7.5 Screen resolution)

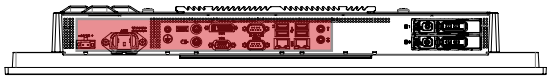
17 inch = 908mm	19 inch = 1011mm	20 inch = 878mm	23 inch = 1011mm	27 inch = 1000mm	

Cables

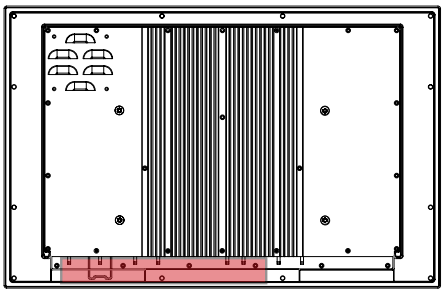
Use only high quality shielded signal cables.

Cable Entries & Connectors (Marked area) - Illustration only

Bottom View



Back View



General Installation Recommendations

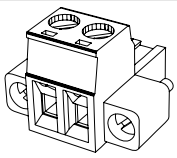
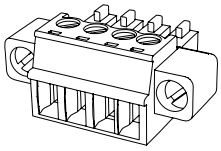
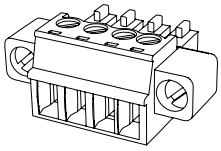
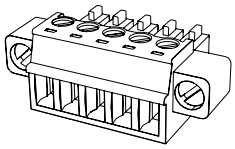
Maximum Cable Length

Any cable should generally be kept as short as possible to provide a high quality input/output. The maximum signal cable length will depend on the signal resolution and frequency, but also on the quality of the signal output from the computer/radar.

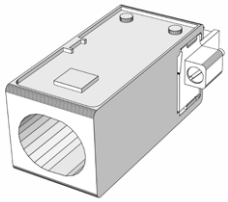
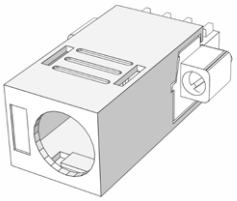
Housing / Terminal Block Connector Overview

Housing / Terminal Block connectors are available in different sizes (2-pin, 4-pin, 5-pin) which plugs into the connector area of the unit. They are mounted by factory default and delivered with the unit. The housing / terminal block connectors have steering rails, which ensures that it can not be mounted wrong. The color of these connectors may vary between black, green and orange depending on manufacturer. You may use approved equivalents of these connectors, but note that warranty will be void if any damage would occur to either the unit's original PCB terminal socket connector or inside the unit (electronic components, boards etc.).

The following table outlines the specifications for connecters commonly used by Hatteland Display:

Illustration	Pins	Manufacturer Details	Connector used for module
	2-pin	Phoenix 1805301 MSTBT 2,5/ 2-STF-5,08	• DC Power IN (24VDC, Single or Dual) Identified on Hatteland Display product data sheet as: "Terminal Block 5.08"
Reference: http://catalog.phoenixcontact.net/phoenix/treeViewClick.do?reloadFrame=true&UID=1805301			
	4-pin	Phoenix 1827732 MC 1,5/ 5-STF-3,81	• Digital Output / Input (Solid State Relay) Identified on Hatteland Display product data sheet as: "Terminal Block 3.81"
Reference: http://catalog.phoenixcontact.net/phoenix/treeViewClick.do?reloadFrame=true&UID=1827732			
	4-pin	Weidmüller 1792970000 BCZ 3.81/04/180F SN BK BX	• CAN Interface (HT 00254 OPT-A1) Identified on Hatteland Display product data sheet as: "Terminal Block 3.81"
Reference: http://catalog.weidmueller.com/catalog/Start.do?localeId=en&ObjectID=1792970000			
	5-pin	Phoenix 1827732 MC 1,5/ 5-STF-3,81	• RS-422 / RS-485 / SCOM (Serial Remote Control) / Buzzer • RS-422 / RS-485 NMEA (PCA100293-1) • Digital Output (Safety Signal Relay, single) • Digital Output & Serial I/O (Mech. Relay / RS-422/RS-485) • Digital Input/Output (HT 00268 OPT-A1) Identified on Hatteland Display product data sheet as: "Terminal Block 3.81"
Reference: http://catalog.phoenixcontact.net/phoenix/treeViewClick.do?reloadFrame=true&UID=1827732			

If your installation require additional cable fasteners support, please visit and purchase directly from manufacturer:
*Note: Illustrations below are approximate, actual Housing and Hood may deviate slightly, but function remains the same.

Phoenix Cable Housing - Illustration	Weidmüller Cover Hood - Illustration
 Phoenix 1803934 - KGG-MSTB 2,5/ 2 (2-pin) Phoenix 1834369 - KGG-MC 1,5/ 4 (4-pin) Phoenix 1834372 - KGG-MC 1,5/ 5 (5-pin)	 Weidmüller 1005290000 - BCZ 3.81 AH04 BK BX (4-pin)
For Phoenix 2-pin, 4-pin and 5-pin: https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1803934&library=usen&pcck=P-11-02-01&tab=1 https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1834369&library=usen&pcck=P-11-02-01&tab=1 https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1834372&library=usen&pcck=P-11-02-01&tab=1 For Weidmüller 4-pin: http://catalog.weidmueller.com/procat/Accessories.jsp;jsessionid=4E3AF6206ACA756C44BD69A5B6F62D48?page=Accessories&productId=(%5b1792970000%5d)	

Configuring Housing / Terminal Block connectors

Below is a brief illustration that might be useful during configuration and installation of such connectors. You will need suitable pre-configured cable(s) and tools to configure the connector(s) and cable(s) that are present in your installation environment. Below is a sample procedure for a 2-pin DC power connector. The procedure is the same for other connectors of this type as listed in table above.

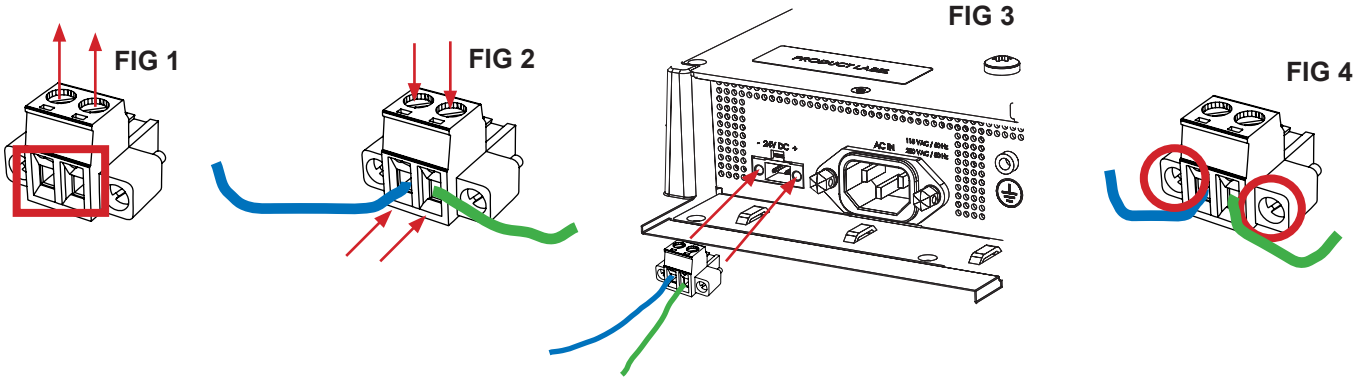


FIG 1: Unscrew (from top) or make sure that the screw terminal (square area) are fully open, so you can secure the inserted cables correctly to the loose housing connector (it may already be plugged into the unit as per factory installation).

FIG 2: Insert cables* (from front) and screw / secure the cables by turning the screw on top of the housing to secure the cables properly. Check that the cables is firmly in place and do not appear loose or falls out when pulling gently.

**Note: Required polarization verification (for instance -/+ for DC power input) should conform with the markings on the connector area of the unit. Ignoring the markings on the unit or its add-on modules might damage the unit and/or external equipment in which end, warranty will be void.*

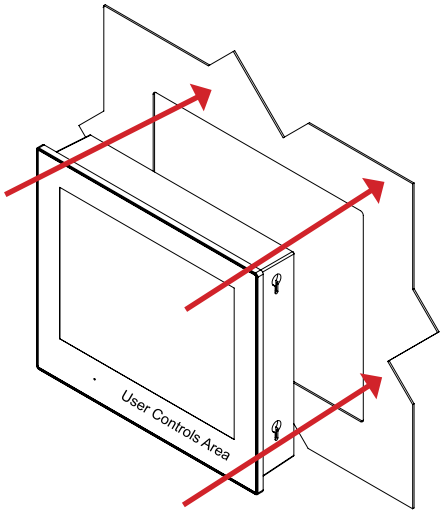
FIG 3: Plug the housing into the appropriate connector area of the unit (glass should be facing down) and check again that the cables secured conforms with the markings on the connector area of the unit. Finalize the installation by fasten the screws located in front on each side of the housing connector **(FIG 4).**

Panel / Console Mounting Key Hole Bracket Kit for 12”,15”,17”,19”

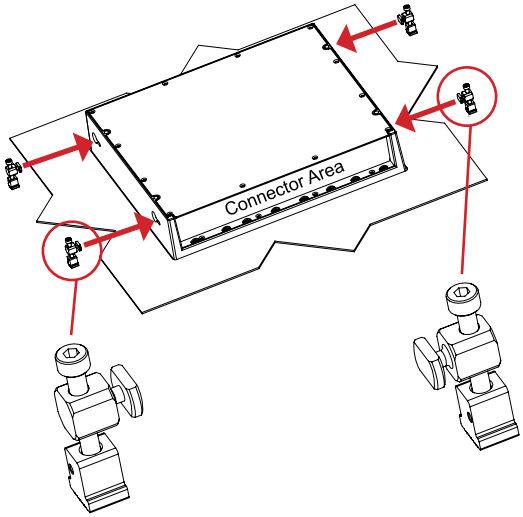
You need: Allen Wrench tool (3mm), 4 pcs of HD CMB SX1-A1 kit (included in delivery).
Procedure suitable for: Display and Panel Computers Series X range.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

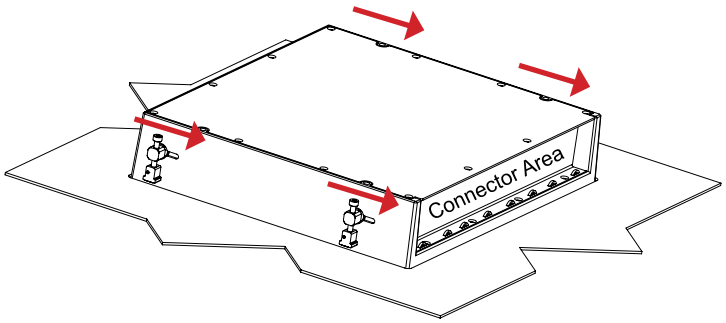
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



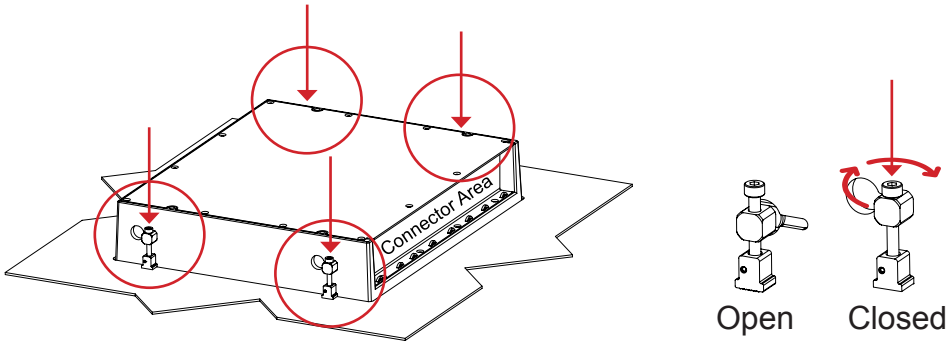
2: Prepare and position the brackets into each of the four key holes. The key part goes into the unit’s largest area of the keyhole, while the Allen screw is visible at the top. See closeup.



3: When all brackets fits inside the keyhole, slide them down into the narrow gap. If you are unable to slide them down, simply adjust/loosen the top Allen Screw slightly and try again.



4: Secure the unit by fastening the top Allen screws fairly. Make sure you do it equally and even for all 4 sides. Do not use excessive force. See closeup of a open and closed position to the right.

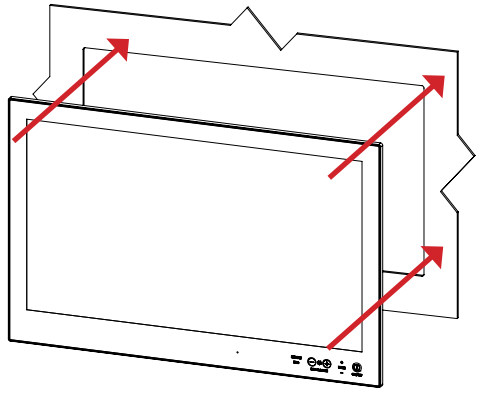


Panel Cutout / Console Mounting Bracket Kit for 24",26"

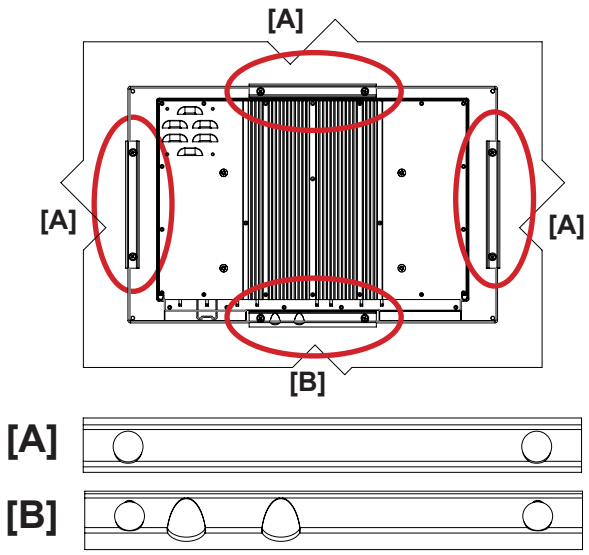
You need: Pozidriv tool, 1 pcs of HD CMB SX1-B1 kit (included in delivery).
Procedure suitable for: Display and Panel Computers Series X range. 24 inch used as illustration below, but same procedure also valid for 26 inch models.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

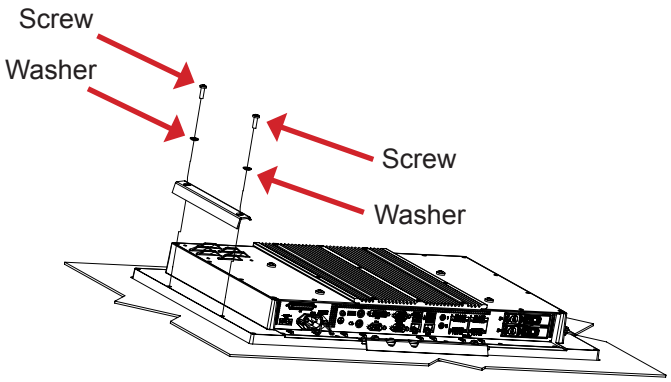
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



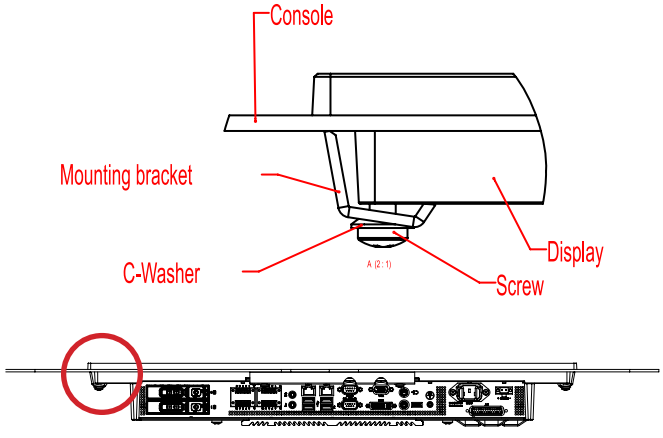
2: Make sure you are aware that brackets should be mounted on TOP, LEFT, RIGHT and BOTTOM sides. Note that the [B] bracket is different than the [A] brackets and mounted near the connectors. See closeup of details.



3: Secure each bracket with the provided M5x16 screws and C-Washers as illustrated below. Make sure you do it equally and even for all 4 sides. Do not use excessive force. 2 screws and 2 washers pr. bracket. Note the orientation of brackets before you begin.



4: Review closeup of the mounting of brackets with screws and C-Washers in place. Seen from bottom side.

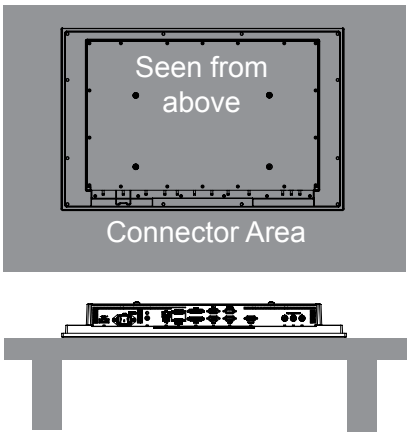


Mounting Bracket for Table / Desktop installation - 24",26"

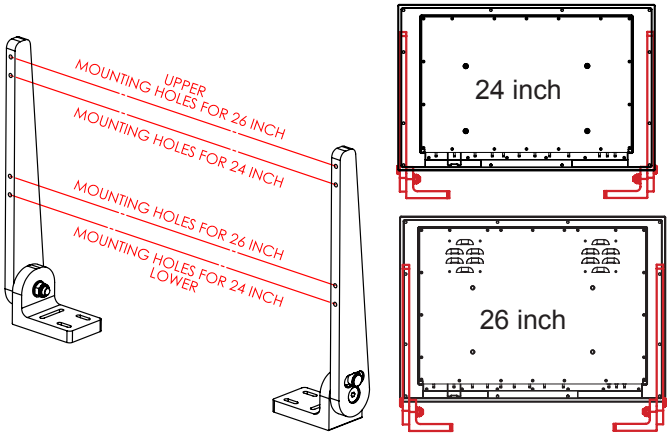
You need: M5, M10 Unbrako® Hex Key tool, M10 Wrench and 1 pcs of HD TMB SX1-C1 Mounting Bracket Kit. Fasteners (6 pcs M6) for Table / Desktop location not included. Procedure suitable for: Display and Panel Computers.

Attention: A suitable pre-drilled location and knowledge of measurements for both main unit and brackets/tilting functionality should be prepared and checked prior to mounting. Please disconnect ALL cables before proceeding. Please review User Manual or visit www.hatteland-display.com for Technical Drawings regarding measurements for both main unit and Mounting Brackets.

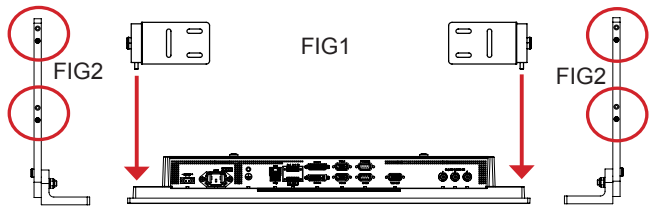
1: Place the unit on a dry, flat, clean, soft surface (i.e. table) with the glass front facing down as illustrated. Connector area should be facing downwards from you.



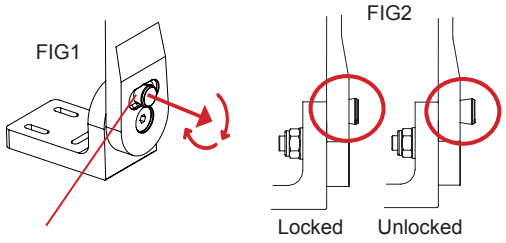
2: Inspect the mounting holes of brackets. For mounting to a 24 inch unit, please use the **lower holes** as indicated. For mounting to a 26 inch unit, please use the **upper holes** as indicated.



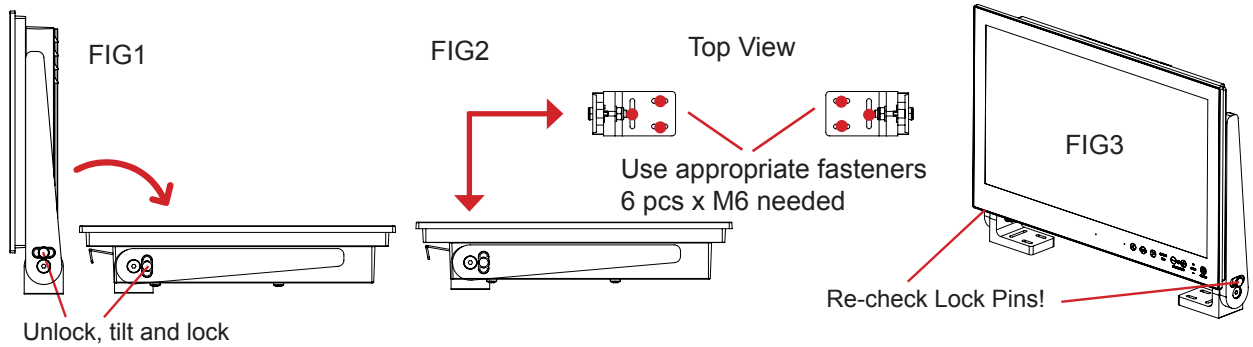
3: Place one bracket at the time with the mounting holes facing down into the suitable mounting position and fasten with 2 x M5 screws on each bracket.



4: While unit is lying flat on table, check the Tilting Lock Pin position. These can be pulled out by hand, turned 90° (FIG1) and turned back 90° until the Lock Pin automatically clicks into place by a spring (FIG2).



5: You may now mount the unit onto your desired location. It is advised that you unlock the Lock Pin (as shown in step 4), tilt the unit 90° backwards (FIG1) and properly fasten the bracket base into location (FIG2).
NB! Be careful not to break or scratch the edge of the front glass! Then repeat step 4 again until your desired tilting position has been achieved and you have verified that the Lock Pin are in locking position and the unit is firmly attached and does not appear loose (FIG3).



Mounting Bracket, Table / Desktop / Ceiling - 12”,15”,17”,19”

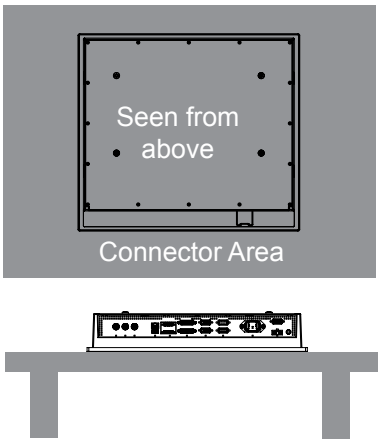
Procedure suitable for: Display (MMD/STD) and Panel Computer (MMC) Series X product ranges.

You need:
- M4, M5, M10 Unbrako® Hex Key tool, M10 Wrench (not included with delivery).
- Fasteners (6 pcs M6) for mounting complete unit onto table or desktop location (not included with delivery).
- 1 pcs of HD xxBRD SX1-A1 Mounting Bracket Kit, where xx=12, 15, 17 or 19 inch (shipped during 2012 > 2013)*
- or 1 pcs of HD TMB SX1-A1 (12” / 15”) or HD TMB SX1-B1 (17” / 19”) Mounting Bracket Kit (shipped during 2013 >)*

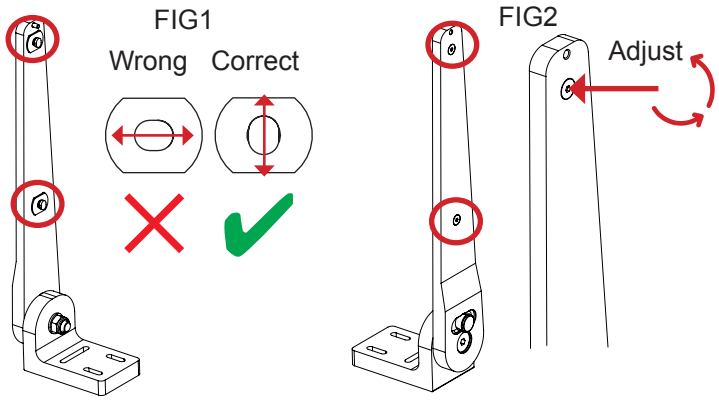
Bracket Arms are clearly marked with Typenumber label so you can identify which version you have (BRD or TMB).
Ceiling mount of complete unit is only supported for “Double Key Hole” units, see next page for infomation.

Attention: A suitable pre-drilled location and knowledge of measurements for both main unit and brackets/tilting functionality should be prepared and checked prior to mounting. Please disconnect ALL cables before proceeding. Please review User Manual or visit www.hatteland-display.com for Technical Drawings regarding measurements for both main unit and Mounting Brackets.

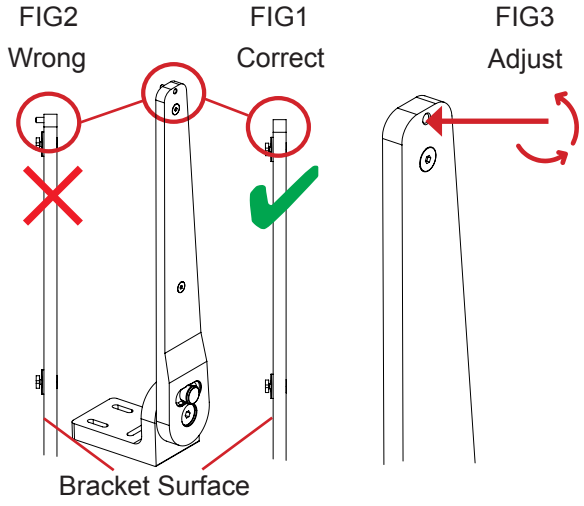
▼ 1: Place the unit on a dry, flat, clean, soft surface (i.e. table) with the glass front facing down as illustrated. Connector area should be facing downwards from you.



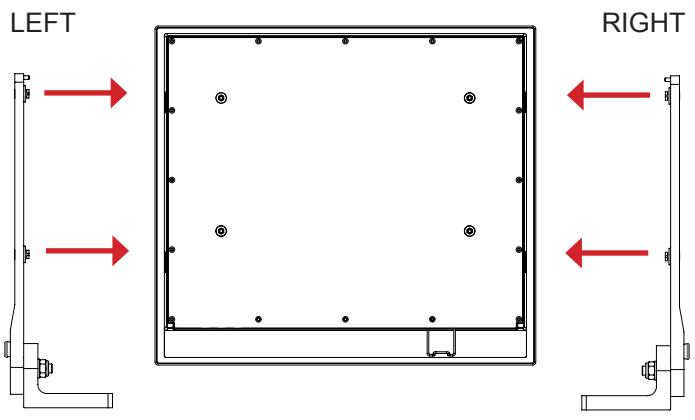
▼ 2: Inspect the inner side of both brackets and especially the orientation of the Key Hole Plug (4 pcs). They should be shaped as an standing “egg” to ensure proper fitting in the Key Hole of unit (FIG1). Note: You may have to loose the fastening screw (M5) (FIG2) if the Key Hole Plug can not be turned by hand.



▼ 3: Verify that the Key Hole Set Screw (M4) is aligned with the bracket surface (FIG1). If this screw appear too far out (FIG2), proper fitting into the Key Hole can not be completed. Turn screw clockwise or anti-clockwise (FIG3) to adjust the position. (BRD version only, not present on TMB version).



▼ 4: Notice the indication of LEFT and RIGHT. The mounting bracket (2 pcs) is marked with respective stickers “L” and “R” from factory. Please make sure that LEFT bracket is positioned on LEFT side and RIGHT bracket is positioned on the RIGHT side as shown below.

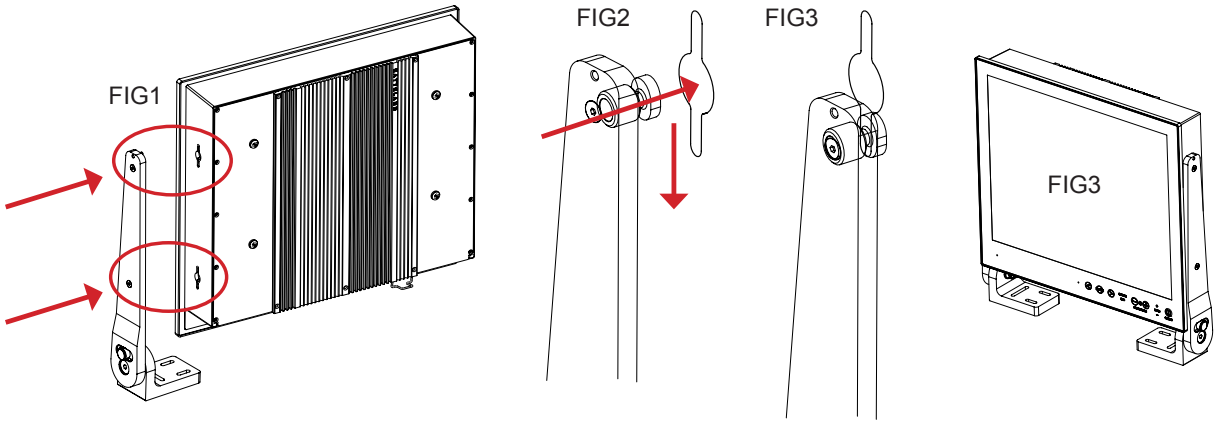


Installation Procedures

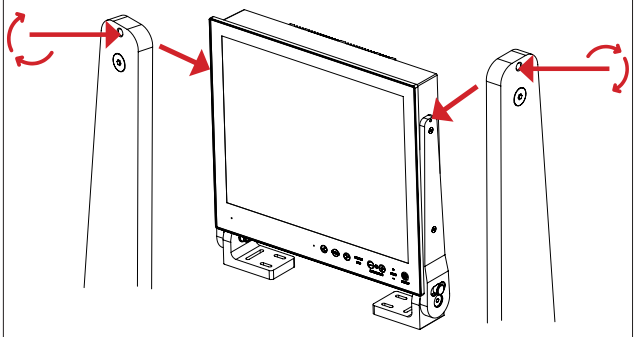
Note: Some units may have Single Key Hole, whilst others have Double Key Hole (Point 5, FIG2/3 in table below) present in the chassis side. This is due to slight variation in initial production vs Mass Production throughout 2012/2013. During early/mid 2013, all units will feature Double Key Hole. Illustration to the right shows Single Key and Double Key cut-out.

Caution:
Single Key hole units does not support ceiling mount. Double Key Hole supports ceiling mount of unit.

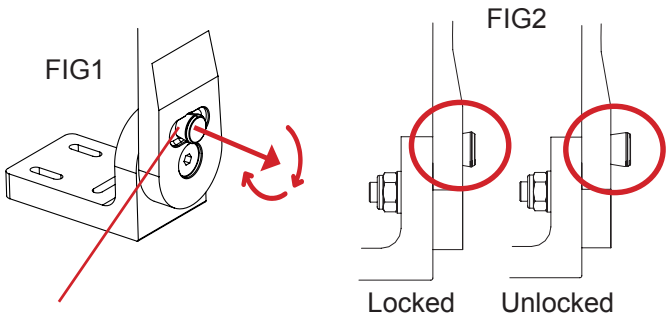
▼ 5: Ensure that both Key Hole Plugs slide into the Key Holes and goes to the bottom position (FIG1 and FIG2). If they appear too tight, you may loose the Key Hole Plug screw a few turns and re-try (see previous step 2). FIG3 shows Key Hole Plug correctly into Key Hole and both brackets in place.



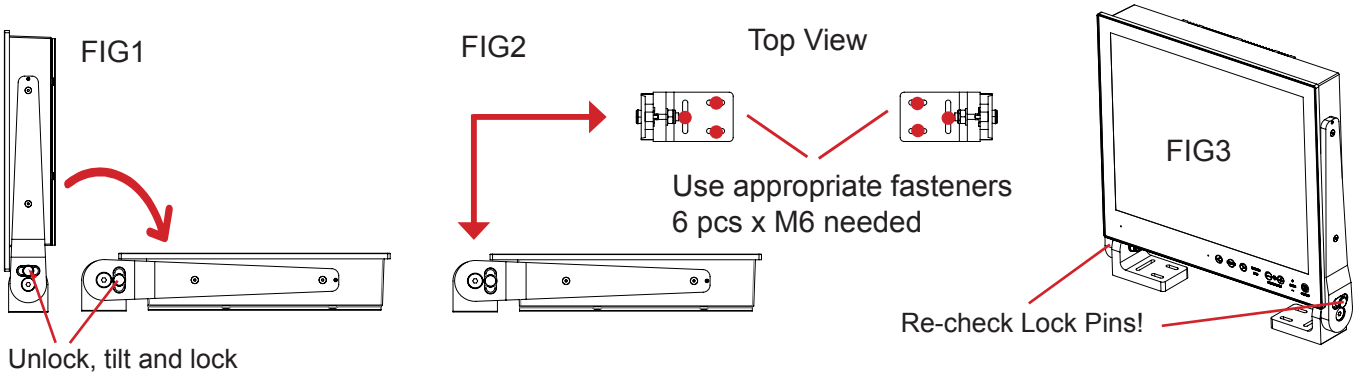
▼ 6: Tighten Key Hole Screw firmly on each side and make sure the brackets are properly mounted and aligned to the main chassis of unit. Verify with your hands that both brackets are firmly attached. (BRD version only, not present on TMB version).



▼ 7: While unit is lying flat on table, check the Tilting Lock Pin position. These can be pulled out by hand, turned 90° (FIG1) and turned back 90° until the Lock Pin automatically clicks into place by a spring (FIG2).

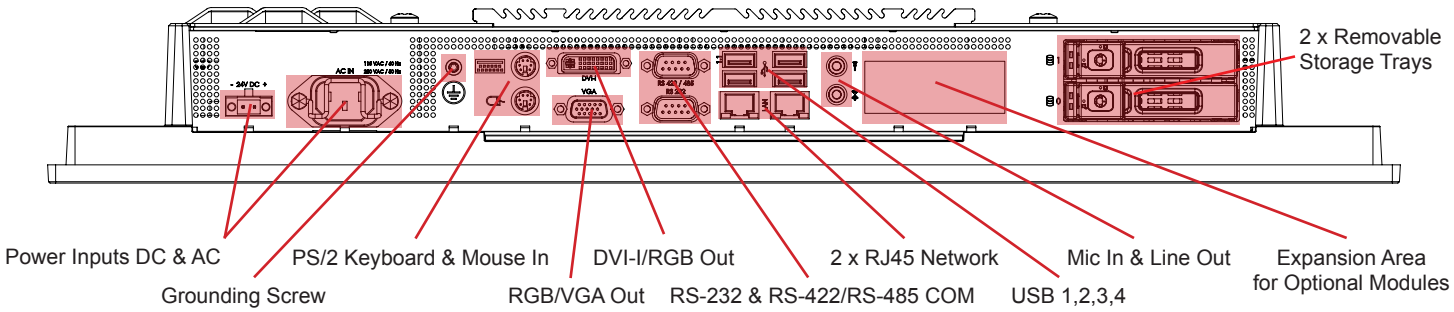


▼ 8: You may now mount the unit onto your desired location. It is advised that you unlock the Lock Pin (as shown in step 7), tilt the unit 90 degrees backwards (FIG1) and properly fasten the bracket base into location (FIG2). **NB! Be careful not to break or scratch the edge of the front glass!** Then repeat step 7 again until your desired tilting position has been achieved and you have verified that the Lock Pin are in locking position and the unit is firmly attached and does not appear loose (FIG3).



Physical Connections

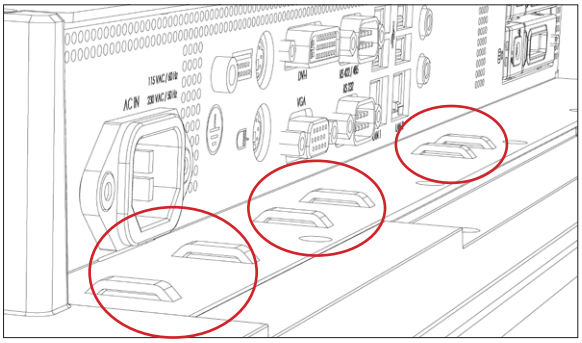
Connection area of unit (illustration)

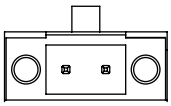


Note: 24 inch unit used as example above, please review specifications for your actual model.

Reduce Cable Tension

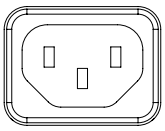
To reduce tension of the cables you connect, secure them with a cable tie to the available chassis hinges located near the connectors. Note that the actual position of these hinges may vary depending on the specific unit.





POWER INPUT:

Connect your DC power cable to the 2-pin Terminal Block 5.08 connector. The internal DC power module supports 24VDC. Please check specifications for your unit.



POWER INPUT:

The internal AC power module supports both 115VAC/60Hz and 230VAC/50Hz power input. Please check specifications for your unit.

GROUNDING SCREW:

Note: DC models are required / recommended to be properly grounded via the ⏚ screw located on the unit. Please review “General Installation Chapter”, pt. 7 for more information.

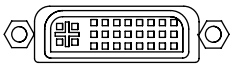
Multi-power note: (For units supporting AC & DC input simultaneously)

The unit has a dual input power supply which will accept both AC and DC input. If both inputs are connected, the unit will be powered by AC. If AC is disconnected it will automatically switch over to DC without affecting the operation of the unit. This makes it possible to use AC power as primary power and a 24V battery as secondary power, eliminating the need for expensive UPS systems.

Physical Connections

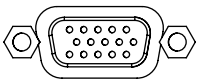
PS/2 Keyboard and PS/2 Mouse INPUTS:

Connect the PS/2 keyboard cable to the PS/2 5P Connector (female) marked with Icon.
Connect the PS/2 mouse cable to the PS/2 5P Connector (female) marked with an Icon.



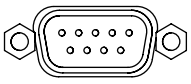
DVI-I or RGB / VGA OUT:

Enables a direct clone signal output from the computer. You may choose to use a DVI-I 29P cable directly or use a DVI-I -> RGB adapter to use a RGB/VGA HD D-SUB 15P instead for this purpose. Connect the cable to the Connector (female) and secure it to the hex spacers provided on the unit. Connect the other end to your equipment and secure it.



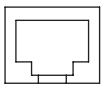
VGA / RGB OUT:

Will output a clone signal from the computer for use with external display or monitor. Connects via a High Density D-SUB 15P Female connector. Fasten the cable to the connector using the provided screws on the cable housing itself.



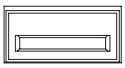
COM1, 2 Serial Port INPUT / OUTPUT:

Supports RS-232 (COM1) and RS-422/485 (COM2) using D-SUB 9P Male connectors. Fasten the cable to the connector using the provided screws on the cable housing itself.



Network 1, 2 INPUT / OUTPUT:

Supports 10/100/1000Mbps Ethernet (LAN). Suitable for twisted pair cables CAT.5E. Make sure the network cable connector ”clicks” into the RJ-45 connector.

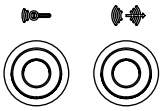


USB 1, 2, 3, 4 INPUT / OUTPUT:

Supports USB compliant peripherals. Drivers for most USB devices are usually included in operating system or on separate installation DVD’s delivered with Third Party products.

- Port 1 is by factory default locked to USB1.1 (<10m, 12Mbps) and the 1.1 symbol is indicated next to the connector. Peripherals that require more or less than 12Mbps should not be connected to this port, as both driver and device will fail to install and initalize correctly. Please re-connect your device into port 2,3,4 instead in these situations.

- Port 2,3,4 is USB2.0 (<5m, 480Mbps) compliant, including support for USB1.1 (<10m, 12Mbps) peripherals.



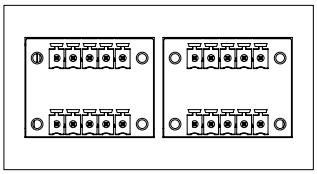
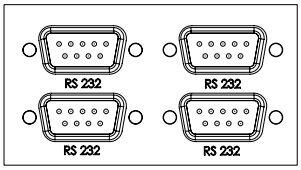
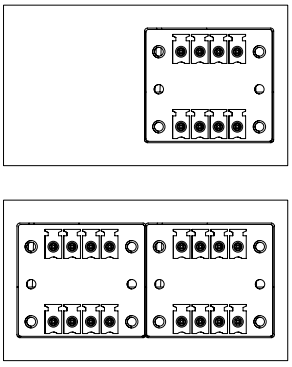
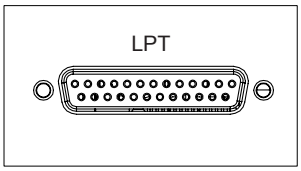
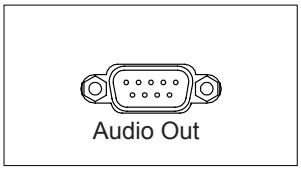
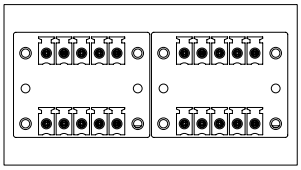
Audio INPUT / OUTPUT:

Both connectors are 3.5mm mini jack stereo.

Light Pink / Mic In	
Microphone symbol	
Light Green / Line Out	
Audio signal symbol	

EXPANSION AREA for Optional modules:

In this expansion area of the unit, optional factory mounted modules may be available (see illustrations below or dedicated Data Sheets as well as “Housing / Terminal Block Connector Overview” in this manual for more information). Connect and secure your cables to the Terminal Blocks or connectors, depending on module installed. The table below lists all modules currently available for factory mounting.

Illustration	Description
	4 x RS-422/RS-485 NMEA (PCA100293-1), Terminal Block 3.81 connection module.
	4 x RS-232 (PCA100294-1), DSUB 9P Male connectors module.
	1 or 2 x CAN isolated (HT 00254 OPT-A1), Terminal Block 3.81, 2 channel module(s).
	1 x Standard LPT1 Parallel (Bi-Directional/EPP/ECP). D-SUB 25P Female connector.
	1 x 2W Amplified Audio Mono/Stereo Out (HT 00235 OPT-A1). D-SUB 9P Female connector.
	2 x Isolated Digital IO (4 Output + 4 Input) (HT 00268 OPT-A1), Terminal Block 3.81 connection module.

Internal support for remote controlling MMC units:

A detailed description of the SCOM (Serial/Ethernet Communication) can be found here: http://www.hatteland-display.com/pdflink/inb100018-4.php - Review also the “Pinout Assignments” chapter in this manual for additional help during preperation and/or installation of external equipment intended to communicate with.

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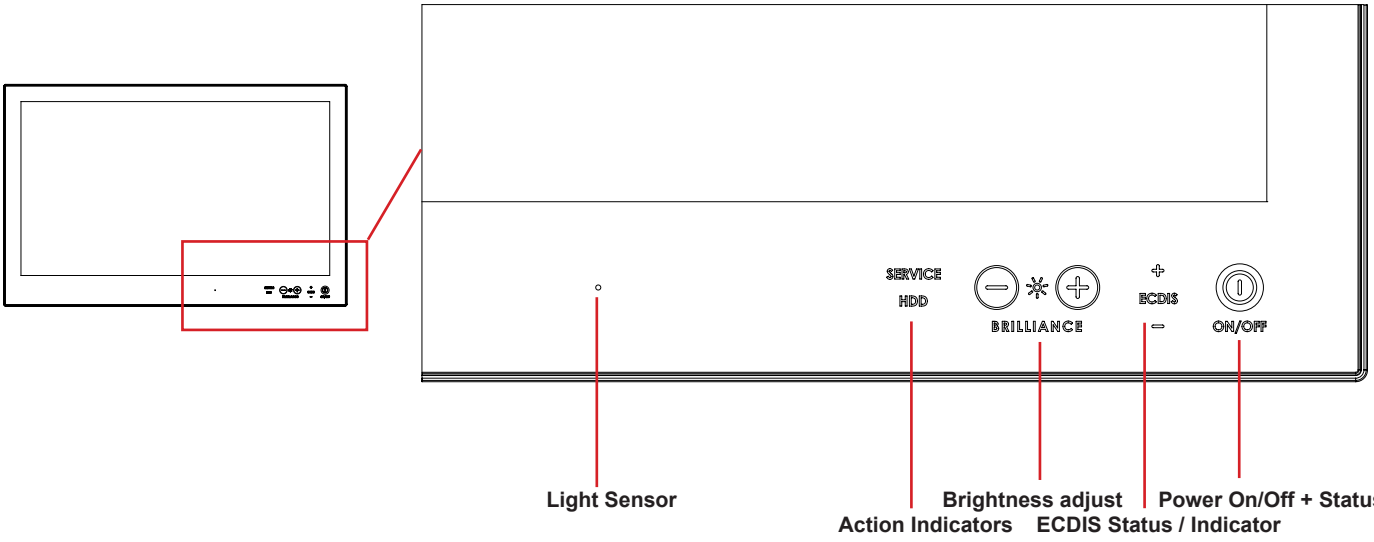
Operation
MMC Products

USER CONTROLS OVERVIEW

The units are designed by using Glass Display Control™ (GDC) touch technology to allow interactivity adjusting brilliance (brightness) and control power on / off with the use of illuminated symbols. Note that these symbols are only visible (backlight illuminated) when suitable power is connected. There is no physical moving knobs, potmeters, wheels or push buttons available as everything is touch surface controlled by Projected Capacitive technology, that allows a human finger (including several types of gloves) to control the unit.



Light Sensor:

Used to sense level of ambient light in the surrounding environment. The sensor data can be read by suitable software through the Hatteland Display SCOM functionality of the unit and thus can be used to control brightness remotely. Note: This sensor is not visible for the eye or has any illumination behind to indicate it's position. Further, by touching or covering this area will naturally make the sensor data inaccurate.

SERVICE HDD **Action Indicators:**

HDD = Whenever there is a storage device activity (HDD/SSD read or write operations) this area will illuminate and blink accordingly in sync. with the read/write operations while the unit is powered. Note that by touching this symbol no action will be performed or has been assigned.

SERVICE = Built in functionality to determine when the unit requires service in order to perform within preset factory standards. This area will illuminate constantly until the unit is powered off. Note that by touching this symbol no action will be performed or has been assigned.

BRILLIANCE **Brightness Adjust:**

Brilliance / Brightness adjustment of the displayed image is adjusted by touching the (-) or (+) illuminated symbols. The entire area of text and symbols are visible as long as the unit is powered. Note that only the (-) and (+) are touch sensitive while the "*" and "BRILLIANCE" symbols are not.

ECDIS **ECDIS Status / Indicator:** (optional factory standard)

For units that has been factory ECDIS calibrated the text "ECDIS" will illuminate in green constantly as long as the unit is powered. The "+" and "-" symbols will illuminate in red when the Brightness/Brillance is adjusted either above or below ECDIS factory calibration point.

To be able to stay within ECDIS calibrated range, please assure that both the "+" and "-" are not illuminated and that "ECDIS" text remains illuminated during operation. Note that by touching these symbols no action will be performed or has been assigned.

Power ON/OFF:

This symbol and all text will illuminate in red when suitable power is connected and the unit is turned off. When the unit is on and operating, this symbol will change into green color and illuminate constantly.

Power ON:

To turn the unit on, verify that the symbol is illuminated in red (indicates suitable power is connected) and touch the power symbol and hold until the the symbol changes to green light or a image appears on the screen.

Power OFF:

To turn the unit off, touch the power symbol and hold until it either illuminate/change from green to red or the image on screen disappears.

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Specifications

Specifications - HD 12T21 MMC-xxx-xxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT active-matrix liquid crystal panel with LED Backlight
- 12.1 inch viewable image size, Aspect Ratio 4:3

TFT Characteristics:

• Native Resolution	: 1024 x 768
• Pixel Pitch (RGB)	: 0.24 (H) x 0.24 (V) mm
• Response Time Standard	: 35ms (typical), black to white
• Response Time High Bright	: 19ms (typical), black to white
• Contrast Ratio Standard	: 700:1 (typical)
• Contrast Ratio High Bright	: 600:1 (typical)
• Light Intensity Standard	: 500 cd/m² (typical)
• Light Intensity High Bright	: 1000 cd/m² (typical)
• Viewable Angle Standard	: +/- 80 deg. (Up/Down/Left/Right) (typical)
• Viewable Angle High Bright	: +/- 80 deg. (D/L/R), +/- 60 deg. (U) (typ)
• Active Display Area	: 245.76 (H) x 184.32 (V) mm
• Max Colors	: 16.7 million

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 sec/min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Resolution	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (max)
Storage	1 x 2.5" SSD SATA (Half Slim) Single or Multi Level	- 8GB
Storage	1 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	1 x 2.5" HDD* SATA *Combination buzzer and spinning hard disk (HDD) is not possible.	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

• 115&230VAC - 50/60Hz + 24 VDC - HD 12T21 MMC-Mxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

• Operating AC/DC: 60W (max) - 26W (typ)*

*Max backlight, Idle CPU load, Microsoft® Windows® 7)

Physical Considerations:

- W:314.00 [12.36"] x H:272.00 [10.71"] x D:70.90 [2.79"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 4.9kg / 10.8lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicator (Service)
- Buzzer (not visible), Light Sensor (not visible)

Environmental Considerations:

• Operating	: Temperature -15 deg. C to +55 deg. C Humidity up to 95%
• Storage	: Temperature -20 deg. C to +60 deg. C Humidity up to 95%
• IP-Rating	: Protection: IP66 front - IP22 rear (EN60529)
• Compass Safe Distance	: Standard: 40cm - Steering: 20cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)

Available Accessories:

• HD CMB SX1-A1	: 1 x Console Mount Kit
• HD 12BRD SX1-A1	: 1 x Mounting Bracket
• HD TMB SX1-A1	: 1 x Table Mount Bracket. EN60945 pending*
• HD VED SX1-A1	: 1 x VESA Bracket
• JH C01MF A-A	: 1 x USB Cable 1m, TypeA-Chassis mount receptacle
• HT 00262 OPT-A1	: 4 x RS-422/RS-485 isolated, USB ext. module
• HT 00263 OPT-A1	: 4 x RS-232 COM non-isolated, USB ext. module
• HT 00264 OPT-A1	: 1 x CAN isolated, 2 channel, USB ext. module
• HT 00273 OPT-A1	: 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

* Release date to be confirmed. Please contact us for more information.

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society (Pending)
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
IP66
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping (Pending)

Specifications - HD 15T21 MMC-xxx-xxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT active-matrix liquid crystal panel with LED Backlight
- 15.0 inch viewable image size, Aspect Ratio 4:3

TFT Characteristics:

- Native Resolution : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time Standard : 8ms (typical), black to white
- Response Time High Bright : 19ms (typical), black to white
- Contrast Ratio Standard : 700:1 (typical)
- Contrast Ratio High Bright : 800:1 (typical)
- Light Intensity Standard : 400 cd/m² (typical)
- Light Intensity High Bright : 1000 cd/m² (typical)
- Viewable Angle Standard : +/- 80 deg. (Up/Down/Left/Right) (typical)
- Viewable Angle High Bright : +/- 80 deg. (D/L/R), +/- 60 deg. (U) (typ)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 million

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 sec/min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Resolution	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (Max)
Storage	2 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	2 x 2.5" HDD* SATA *Combination buzzer and spinning hard disk (HDD) is not possible.	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 15T21 MMC-Mxx-xxxx
- 12-24VDC - HD 15T21 MMC-Fxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC : 60 W (max) TBC

Physical Considerations:

- W:356.00 [14.02"] x H:307.00 [12.09"] x D:77.90 [3.07"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 6.0kg / 13.2lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicator (Service)
- Buzzer (not visible), Light Sensor (not visible)

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
Humidity up to 95%
- IP-Rating : Protection: IP66 front - IP22 rear (EN60529)
- Compass Safe Distance : Standard: 55cm - Steering: 40cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)

Available Accessories:

- HD CMB SX1-A1 : 1 x Console Mount Kit
- HD 15BRD SX1-A1 : 1 x Mounting Bracket
- HD TMB SX1-A1 : 1 x Table Mount Bracket. EN60945 pending*
- HD VED SX1-A1 : 1 x VESA Bracket
- JH C01MF A-A : 1 x USB Cable 1m, TypeA-Chassis mount receptacle
- HT 00262 OPT-A1 : 4 x RS-422/RS-485 isolated, USB ext. module
- HT 00263 OPT-A1 : 4 x RS-232 COM non-isolated, USB ext. module
- HT 00264 OPT-A1 : 1 x CAN isolated, 2 channel, USB ext. module
- HT 00273 OPT-A1 : 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

* Release date to be confirmed. Please contact us for more information.

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society (Pending)
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
IP66
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping (Pending)

Specifications - HD 17T21 MxC-xxx-xxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT active-matrix liquid crystal panel with LED Backlight
- 17.0 inch viewable image size, Aspect Ratio 5:4

TFT Characteristics:

- Native Resolution : 1280 x 1024
- Pixel Pitch (RGB) : 0.264 (H) x 0.264 (V) mm
- Response Time : 5ms (typical), "black" to "white"
- Contrast Ratio : 1000:1 (typical)
- Light Intensity Standard : 350 cd/m² (typical)
- Light Intensity High Bright : 1000 cd/m² (typical)
- Viewable Angle : +/- 80 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 337.92 (H) x 270.336 (V) mm
- Max Colors : 16.7 million

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD or Option for max 2 x 2.5" devices internally (RAID 0,1) or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 sec/min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Res.	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Celeron® P4505, 1.86GHz, 2MB Cache, FSB 800MHz or 1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (Max)
Storage	2 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	2 x 2.5" HDD* SATA *Combination buzzer and spinning hard disk (HDD) is not possible.	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 17T21 MxC-Mxx-xxxx
- 12-24VDC - HD 17T21 MxC-Fxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC: 60W (max) - 43W (typ)*

*Max backlight, Idle CPU load, Microsoft® Windows® 7)

Physical Considerations:

- W:390.00 [15.35"] x H:351.00 [13.82"] x D:79.90 [3.15"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 7.5kg / 16.5lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
Humidity up to 95%
- IP-Rating : Protection: IP66 front - IP22 rear (EN60529)
- Compass Safe Distance : Standard: 115cm - Steering: 70cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)

Available Accessories:

- HD CMB SX1-A1 : 1 x Console Mount Kit
- HD 17BRD SX1-A1 : 1 x Mounting Bracket
- HD TMB SX1-B1 : 1 x Table Mount Bracket. EN60945 pending*
- HD VED SX1-A1 : 1 x VESA Bracket
- JH C01MF A-A : 1 x USB Cable 1m, TypeA-Chassis mount receptacle
- HT 00262 OPT-A1 : 4 x RS-422/RS-485 isolated, USB ext. module
- HT 00263 OPT-A1 : 4 x RS-232 COM non-isolated, USB ext. module
- HT 00264 OPT-A1 : 1 x CAN isolated, 2 channel, USB ext. module
- HT 00273 OPT-A1 : 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

* Release date to be confirmed. Please contact us for more information.

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model
- Color Calibrated models (ECDIS)
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

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BV - Bureau Veritas
IP66
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping (Pending)

Specifications - HD 19T21 MxC-xxx-xxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT active-matrix liquid crystal panel with LED Backlight
- 19.0 inch viewable image size, Aspect Ratio 5:4
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

• Native Resolution	: 1280 x 1024
• Pixel Pitch (RGB)	: 0.294 (H) x 0.294 (V) mm
• Response Time	: 20ms (typical), "black" to "white"
• Contrast Ratio	: 1000:1 (typical)
• Light Intensity Standard	: 300 cd/m² (typical)
• Light Intensity High Bright	: 800 cd/m² (typical)
• Viewable Angle	: +/- 89 deg. (typical) (Up/Down/Left/Right)
• Active Display Area	: 376.32 (H) x 301.056 (V) mm
• Max Colors	: 16.7 million

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD or Option for max 2 x 2.5" devices internally (RAID 0,1) or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 sec/min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Res.	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Celeron® P4505, 1.86GHz, 2MB Cache, FSB 800MHz or 1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (Max)
Storage	2 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	2 x 2.5" HDD* SATA *Combination buzzer and spinning hard disk (HDD) is not possible.	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 19T21 MxC-Mxx-xxxx
- 12-24VDC - HD 19T21 MxC-Fxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC: 125W (max) - 49W (typ)*

*Max backlight, Idle CPU load, Microsoft® Windows® 7)

Physical Considerations:

- W:429.00 [16.89"] x H:382.00 [15.04"] x D:80.90 [3.19"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 8.6 kg / 18.9 lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

Environmental Considerations:

• Operating	: Temperature -15 deg. C to +55 deg. C Humidity up to 95%
• Storage	: Temperature -20 deg. C to +60 deg. C Humidity up to 95%
• IP-Rating	: Protection: IP66 front - IP22 rear (EN60529)
• Compass Safe Distance	: Standard: 70cm - Steering: 45cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)

Available Accessories:

• HD CMB SX1-A1	: 1 x Console Mount Kit
• HD TMB SX1-B1	: 1 x Table Mount Bracket. EN60945 pending*
• HD VED SX1-A1	: 1 x VESA Bracket
• JH C01MF A-A	: 1 x USB Cable 1m, TypeA-Chassis mount receptacle
• HT 00262 OPT-A1	: 4 x RS-422/RS-485 isolated, USB ext. module)
• HT 00263 OPT-A1	: 4 x RS-232 COM non-isolated, USB ext. module
• HT 00264 OPT-A1	: 1 x CAN isolated, 2 channel, USB ext. module
• HT 00273 OPT-A1	: 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

* Release date to be confirmed. Please contact us for more information.

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model
- Color Calibrated models (ECDIS)
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society (Pending)
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
IP66
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping (Pending)

Specifications - HD 24T21 MxC-xxx-xxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT active-matrix liquid crystal panel with LED Backlight
- 24.0 inch viewable image size, Widescreen, Aspect Ratio 16:9
- MVA (Multi-domain Vertical Alignment) LCD Technology, RGB vertical stripe

TFT Characteristics:

• Native Resolution	: 1920 x 1080 (FHD)
• Pixel Pitch (RGB)	: 0.276 (H) x 0.276 (V) mm
• Response Time	: 25 ms (typical), "black" to "white"
• Contrast Ratio	: 3000:1 (typical)
• Light Intensity Standard	: 300 cd/m² (typical)
• Light Intensity High Bright	: 1000 cd/m² (typical)
• Viewable Angle	: +/- 89 deg. (typical) (Up/Down/Left/Right)
• Active Display Area	: 531.36 (H) x 298.89 (V) mm
• Max Colors	: 16.7 millions (RGB 8-bit)

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD. Option for 2 x 2.5" removable HDD(SATA),Raid 0,1 or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 sec/min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Resolution	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Celeron® P4505, 1.86GHz, 2MB Cache, FSB 800MHz or 1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (Max)
Storage	2 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	2 x 2.5" HDD SATA	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

• 115&230VAC - 50/60Hz + 24 VDC - HD 24T21 MxC-Mxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

• Operating AC/DC: 125W (max) - 50W (typ)*

*Max backlight, Idle CPU load, Microsoft® Windows® 7)

Physical Considerations:

- W:593.00 [23.35"] x H:384.00 [15.12"] x D:76.40 [3.01"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 11.2 kg / 24.6 lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicators (ECDIS, Service)
- Buzzer, Light Sensor (not visible)

Environmental Considerations:

• Operating	: Temperature -15 deg. C to +55 deg. C Humidity up to 95%
• Storage	: Temperature -20 deg. C to +60 deg. C Humidity up to 95%
• IP-Rating	: Protection: IP66 front - IP22 rear (EN60529)
• Compass Safe Distance	: Standard: 115cm - Steering: 70cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)
• HDD/SSD Tray	2 x 2.5" Sized Tray/Bay (1 x factory default occupied)

Available Accessories:

• HD CMB SX1-B1	: 1 x Console Mount Kit
• HD TMB SX1-C1	: 1 x Table Mount Bracket. EN60945 Tested
• HD VED SX1-A1	: 1 x VESA Bracket
• JH C01MF A-A	: 1 x USB Cable 1m, TypeA-Chassis mount receptacle
• HT 00262 OPT-A1	: 4 x RS-422/RS-485 isolated, USB ext. module
• HT 00263 OPT-A1	: 4 x RS-232 COM non-isolated, USB ext. module
• HT 00264 OPT-A1	: 1 x CAN isolated, 2 channel, USB ext. module
• HT 00273 OPT-A1	: 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model
- Color Calibrated models (ECDIS)
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society (Pending)
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
IP66
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping (Pending)

Specifications - HD 26T21 MxC-xxx-xxxx (LED/CCFL version)

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED or CCFL Backlight
- 25.54 inch viewable image size, Widescreen, Aspect Ratio 16:10
- S-MVA, Active Matrix, Thin Film Transistor (TFT), RGB Vertical Stripe

TFT Characteristics:

- Native Resolution : 1920 x 1200
- Pixel Pitch (RGB) : 0.2865 (H) x 0.2865 (V) mm
- Response Time (CCFL) : 8 ms (typical), "gray" to "gray"
- Response Time (LED) : 20ms (Tr+Tf)
- Contrast Ratio : 1500:1 (typical)
- Light Intensity Standard : 350 cd/m^2 (typical)
- Light Intensity High Bright : TBD
- Viewable Angle : +/- 88 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 550.08 (H) x 343.8 (V) mm
- Max Colors : 16.7 million

Computer Specifications:

• Installed OS	: None or see table below
• Installed Storage	: 1 x 250GB 2.5" HDD. Option for 2 x 2.5" removable HDD(SATA),Raid 0,1 or see table below
• CPU/Processor	: See table below
• Installed Memory	: 1 x 2GB DDR3 1066/800MHz or see table below
• System Chipset	: Intel® BD82QM57
• Graphics Chipset	: Intel® Arrandale IGD supports DVMT 5.0
• Ethernet LAN #1	: Intel® 82577LM Gigabit LAN 10/100/1000Mbps
• Ethernet LAN #2	: Realtek RTL8111C Gigabit LAN 10/100/1000Mbps
• Audio Chipset	: Realtek ALC892
• BIOS	: UEFI AMIBIOS
• Speaker / Buzzer	: No Speaker / 3500Hz Buzzer
• Watchdog Timer	: 256 Segments, 0, 1, 2...255 Sec/Min
• Power Manager	: ACPI S3/S4
• Monitoring	: Temperature and voltages status
• Other Features	: GPIO, LAN Wakeup, USB Boot and Wakeup
• DVI-I OUT Resolution	: From 640 x 480 to 1920 x 1200 @ 60 Hz
• RGB OUT Resolution	: From 640 x 480 to 2048 x 1536 @ 75 Hz
• Sync. Range	: Hor: 31.5 kHz to 91.1 kHz, Ver: 60 Hz* to 85 Hz

Available Computer Configurations:

Type	Description	Size/Specification
CPU	1 x Intel® Celeron® P4505, 1.86GHz, 2MB Cache, FSB 800MHz or 1 x Intel® Core™ i7-620LE, 2.0GHz, 4MB Cache, FSB 1066MHz	
Memory	1 x Single Channel, 204-pin DDR3	- 1GB, 2GB, 4GB (Max)
Storage	2 x 2.5" SSD SATA, Single (SLC) or Multi Level (MLC)	- 40GB, 80GB, 120GB, 300GB
Storage	2 x 2.5" HDD SATA	- 250GB, 500GB, 1TB
OS Option	Embedded Enterprise (WEE): - Microsoft® Windows® XP Professional (Eng, SP3 or SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1) openSUSE® 11.4 (Linux) Fedora™ 15 (Linux) Ubuntu® 10.04 LTS Ubuntu® 12.04 LTS	
Notes	- For Win7 OS, >1GB RAM + Review "SSD Selection Guide" in manual. - 32bit or 64bit versions available where applicable.	

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 26T21 MxC-Mxx-xxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC : 125 W (max) TBC
  : TBD (typ) at max backlight+high CPU load

Physical Considerations:

- W:621.00 [24.45"] x H:435.00 [17.13"] x D:97.70 [3.85"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 16.2kg / 35.6lbs

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, Brightness Control (-/+), Hotkeys (left/right)
- Power LED, HDD/SSD LED, Mode Status Indicators (ECDIS, Service)
- Buzzer, Light Sensor (not visible)

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  Humidity up to 95%
- IP-Rating : Protection: IP66 front - IP22 rear (EN60529)
- Compass Safe Distance : Standard: 125cm - Steering: 80cm

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

PRELIMINARY

Input / Output Connectors:

Connector	Rear
• Ethernet GBLan	2 x RJ-45
• Keyboard	1 x PS/2 (purple)
• Mouse	1 x PS/2 (green)
• COM RS-232	1 x DB9M non-isolated
• COM RS-422/485	1 x DB9M non-isolated
• USB1.1 (<10m)	1 x USB Type A
• USB2.0 (<5m)	3 x USB Type A
• DVI or RGB OUT	1 x 29P DVI-I or as RGB with adapter
• RGB OUT	1 x 15p HD D-SUB
• AC Power IN	1 x Std IEC inlet
• DC Power IN	1 x 2-pin Terminal Block 5.08
• Line OUT	1 x 3.5mm mini jack (Lime)
• Mic IN	1 x 3.5mm mini jack (Pink)
• HDD/SSD Tray	2 x 2.5" Sized Tray/Bay (1 x factory default occupied)

Available Accessories:

- HD CMB SX1-C1 : 1 x Console Mount Kit
- HD TMB SX1-C1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket
- JH C01MF A-A : 1 x USB Cable 1m, TypeA-Chassis mount receptacle
- HT 00262 OPT-A1 : 4 x RS-422/RS-485 isolated, USB ext. module
- HT 00263 OPT-A1 : 4 x RS-232 COM non-isolated, USB ext. module
- HT 00264 OPT-A1 : 1 x CAN isolated, 2 channel, USB ext. module
- HT 00273 OPT-A1 : 4 x Digital IN/OUT isolated, USB ext. module

Please see user manual/datasheet for more information

Factory Options:

- Capacitive Touch Screen w/Cosmetic alu front frame (USB,-FxxC models)*
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model*
- Color Calibrated models (ECDIS)
- Variations of SSD/HDD Storage, RAM Memory, Operating System
- 1 x PCA100293-1 (4xCOM RS-422/485 isolated NMEA 2 channel)
- 1 x HT 00254 OPT-A1 (1 x CAN isolated, 2 channel)
- 1 x PCA100294-1 (4xCOM DB9M RS-232 non-isolated module)
- 1 x HT 00235 OPT-A1 (2W Amplified Audio out via DB9F)
- 1 x HT 00268 OPT-A1 (Isolated Digital IO module, 4 x Output / 4 x Input)

* Release date to be confirmed. Please contact us for more information.

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-4.php

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society (Pending)
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ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
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All specifications are subject to change without prior notice!

DATA SHEET

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HATTELAND® DISPLAY

Manufacturer:	**Hatteland Display AS**
Product:	**CAN Module with CO-Processor**
Typenumber:	**HT 00254 OPT-A1**

Last Revised:	**14 May 2013**
Revision#:	**10**

CAN MODULE with CO-Processor

Description:

CAN Module with CO-Processor (NXP LPC1756) is a USB to dual isolated CAN interface board. This card will mainly be integrated, electrical and mechanical by factory default for Series X 8, 12, 13, 15, 17, 19, 24, 26 inch Panel Computers and selected Stand-alone Computers. The Hatteland Display CAN Module is delivered with software download functions and standard API, SAE J2534, which allow the user to add their own functions, such as real time critical functions, and high level CAN protocol. The CAN Module can operate as a standalone unit, which can be configured to operate independent of application software and hardware. This allow the user to use the CAN Module for time and safe critical operations.

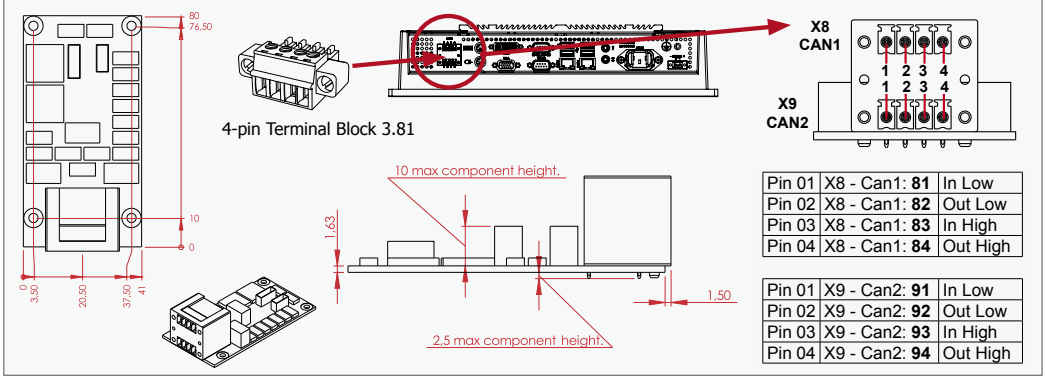
Cost effective CAN solution, Withstand marine requirements, General and open architecture that will allow the end customer to modify and handle the source code, General CAN interface support, NMEA2000, J1939, CANOpen.

Specifications

• Number of CAN interfaces	2 independent channels isolated from each other
• Version	CAN 2.0B
• Isolation	Galvanic isolation 2kV, CAN1 to CAN2 and port to chassis
• Protection	- Continuous short circuit signal to signal - Continuous short circuit to isolated GND - Continuous shorts to ±27V
• ESD rating on CAN bus	ESD rating of ±12kV Human body model
• Min Baud rate	64kbit
• Max baud rate	500kbit
• Address mode	11/29bit
• Terminating	No termination on PCB, user will put them in connector
• PCB Connector	Weidmüller 1973600000 (SCD 3.81/08/90F 3.2SN BK BX) (Do not connect to this, use Terminal Block)
• Cable connector	2 x Weidmüller 1792970000 (BCZ 3.81/04/180F SN BK BX) Terminal Block (see illustration below)
• Cable	Twisted pair, no ground
• Supported protocols	SAE J2934 Standard Data Bus Interface
• Supported OS	**Embedded Enterprise (WEE):** Microsoft® Windows® XP Professional (Eng, SP3, SP2c), Microsoft® Windows® Server 2003/2008/2008R2 (Eng), Microsoft® Windows® 2003/2008/2008R2 (Eng), Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1). **Linux:** openSUSE® 11.4, Fedora™ 15, Ubuntu® 10.04 LTS, Ubuntu® 12.04 LTS.
• Test and certificate	Hatteland Display standard (tested / type approved by the following classification societies): **IEC 60945 4th** (EN 60945:2002), **IACS E10**, **ClassNK** - Nippon Kaiji Kyokai, **GL** - Germanischer Lloyd, **DNV** - Det Norske Veritas, **ABS** - American Bureau of Shipping, **CCS** - China Classification Society (Pending), **BV** - Bureau Veritas, **LRS** - Lloyd's Register of Shipping (Pending)

Illustration and Pinning:

Note: Product below for illustration only. Location of module and product size/design may differ. Connector/pinning remain the same.



Pin 01	X8 - Can1: **81**	In Low
Pin 02	X8 - Can1: **82**	Out Low
Pin 03	X8 - Can1: **83**	In High
Pin 04	X8 - Can1: **84**	Out High

Pin 01	X9 - Can2: **91**	In Low
Pin 02	X9 - Can2: **92**	Out Low
Pin 03	X9 - Can2: **93**	In High
Pin 04	X9 - Can2: **94**	Out High

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Hatteland Display AS, Åmsosen, N-5578 Nedre Vats, Norway
Tel: (+47) 4814 2200 - mail@hatteland-display.com - www.hatteland-display.com

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HATTELAND® DISPLAY

Manufacturer:	**Hatteland Display AS**
Product:	**4 channel RS-422 / RS-485 COM module**
Typenumber:	**PCA100293-1**

Last Revised:	**18 Apr 2013**
Revision#:	**11**

4 channel RS-422 / RS-485 COM module

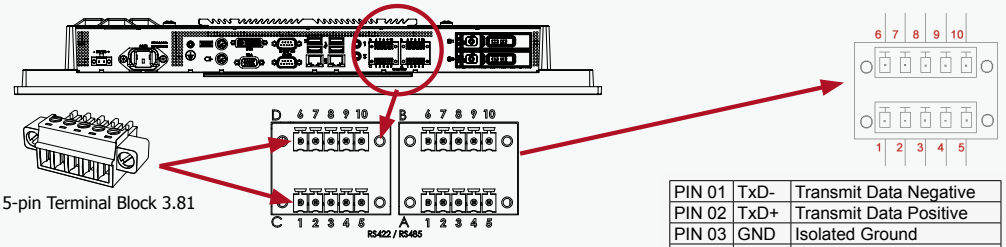
Description:

The Hatteland Display COM modules provide the system with quad independent COM channels. The module is attached to the motherboard via standard USB interface. Application software access the COM channels as standard COM devices, i.e. in the normal case is there no requirements for additional software development. This module will mainly be integrated, electrical and mechanical, in the final products, such as; Series X 12, 13, 15, 17, 19, 24, 26 inch Panel Computers and selected Stand-alone Computers.

Internal USB to 4 channel x RS-485 / RS-422 isolated	
• Features	- 4 independent channels (If card is replaced most OS will not change COM port number). - Outputs are short circuits protected. Inputs are protected. - Driver strength are approved. - All channels is fully isolated, channel to channel and channel to chassis. - Classified towards IEC61162-1 and IEC61162-2. - Tested according to EN61162. - NMEA-183 Compliant. - All requirement for usage in ECDIS applications/systems is fulfilled.
• Absolute Max voltage applied to outputs	-8V to +13V
• Data Rate / Technical Data Output	- Outputs 230kbps (Theoretically 400kbps). - ±15kV ESD protection on all RS-485 signals. - Isolation rating = 2000VRMS, not intended for connection to live power nets.
• Transmitter enable mode	- Standard mode is automatic. - Standard Mode will accept send by RTS, but will in fact ignore RTS. - Each channel have a overide jumper* which can be used to force the transmitter to always be active.
• Cable connector	4 x Phoenix 1827732 (MC 1,5/ 5-STF-3,81) Terminal Block (see illustration below)
• Supported Operating Systems (OS)	**Embedded Enterprise (WEE):** Microsoft® Windows® XP Professional (Eng, SP3, SP2c), Microsoft® Windows® Server 2003/2008/2008R2 (Eng), Microsoft® Windows® 2003/2008/2008R2 (Eng), Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1). **Linux:** openSUSE® 11.4, Fedora™ 15, Ubuntu® 10.04 LTS, Ubuntu® 12.04 LTS.
• Test and certificate	Hatteland Display standard, (tested / type approved by the following classification societies): **IEC 60945 4th** (EN 60945:2002), **IACS E10**, **ClassNK** - Nippon Kaiji Kyokai, **GL** - Germanischer Lloyd, **DNV** - Det Norske Veritas, **ABS** - American Bureau of Shipping, **CCS** - China Classification Society (Pending), **BV** - Bureau Veritas, **LRS** - Lloyd's Register of Shipping (Pending)

Illustration and Pinning:

Note: Product below for illustration only. Location of module and product size/design may differ. Connector/pinning remain the same.



5-pin Terminal Block 3.81

PIN 01	TxD-	Transmit Data Negative
PIN 02	TxD+	Transmit Data Positive
PIN 03	GND	Isolated Ground
PIN 04	RxD-	Receive Data Negative
PIN 05	RxD+	Receive Data Positive
PIN 06	TxD-	Transmit Data Negative
PIN 07	TxD+	Transmit Data Positive
PIN 08	GND	Isolated Ground
PIN 09	RxD-	Receive Data Negative
PIN 10	RxD+	Receive Data Positive

4 Ports (Virtual COM) identified in the Operating System (OS):
COMx (A), COMx (B), COMx (C), COMx (D)*
*Configuration dependent, x = next available port number(s) OS.

RS-485 Half Duplex (2-wire, supports ECHO) Configuration:
Connect TX and RX pair-wise: TX- to RX-, TX+ to RX+.

*Note: The jumper for "force of transmitter" is open by factory default. For some custom models this jumper is preset to closed (active), in that case unit has to be opened and jumper set to open to allow Half Duplex mode.

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Hatteland Display AS, Åmsosen, N-5578 Nedre Vats, Norway
Tel: [+47] 4814 2200 - mail@hatteland-display.com - www.hatteland-display.com

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HATTELAND® DISPLAY

Manufacturer:	**Hatteland Display AS**
Product:	**COM Module RS-232**
Typenumber:	**PCA100294-1**

Last Revised:	**18 Apr 2013**
Revision#:	**06**

COM MODULE

Description:

The Hatteland Display COM modules provide the system with quad independent COM channels. The module is attached to the motherboard via standard USB interface. Application software access the COM channels as standard COM devices, i.e. in the normal case is there no requirements for additional software development. This module will mainly be integrated, electrical and mechanical, in the final product such as Series X 12, 13, 15, 17, 19, 24 and 26 inch Panel Computers and selected Stand-alone Computers.

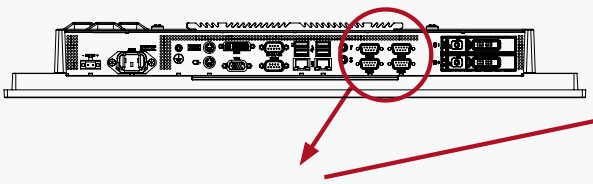
Features:

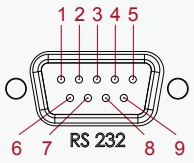
- 4 independent channels (If a card is replaced most operating system will not change COM port number)
- Outputs are short circuits protected

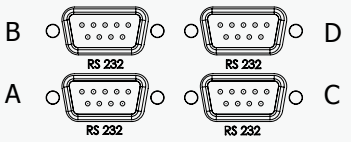
Internal USB to 4 channel x RS-232 non isolated	
• Features	All channels have support for all RS-232 DB-9 signals
• Connector	Standard RS-232 DB-9 male housing and pinning
• Data Rate	230kbps
• ESD Rating (IEC 1000-4-2 Air) (RS-232 I/Os)	±15 kV
• ESD Rating (IEC 1000-4-2 Contact) (RS-232 I/Os)	±8 kV
• Test and certificate	Hatteland Display standard, (tested / type approved by the following classification societies): **IEC 60945 4th** (EN 60945:2002), **IACS E10**, **ClassNK** - Nippon Kaiji Kyokai (Pending), **GL** - Germanischer Lloyd, **DNV** - Det Norske Veritas, **ABS** - American Bureau of Shipping, **CCS** - China Classification Society (Pending), **BV** - Bureau Veritas, **LRS** - Lloyd's Register of Shipping (Pending)
• Supported Operating Systems (OS)	**Embedded Enterprise (WEE):** Microsoft® Windows® XP Professional (Eng, SP3, SP2c), Microsoft® Windows® Server 2003/2008/2008R2 (Eng), Microsoft® Windows® 2003/2008/2008R2 (Eng), Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1). **Linux:** openSUSE® 11.4, Fedora™ 15, Ubuntu® 10.04 LTS, Ubuntu® 12.04 LTS.

Illustration and Pinning:

Note: Product below for illustration only. Location of module and product size/design may differ. Connector/pinning remain the same.







4 Ports available in Operating System as:
COMx (A), COMx (B), COMx (C), COMx (D)*

PIN 01	DCD	Data Carrier Detect
PIN 02	RxD	Receive Data
PIN 03	TxD	Transmit Data
PIN 04	DTR	Data Terminal Ready
PIN 05	GND	Signal Ground
PIN 06	DSR	Data Set Ready
PIN 07	RTS	Request To Send
PIN 08	CTS	Clear To Send
PIN 09	RI	Ring Indicator

*Configuration dependent, x = next available port number(s) in operating system.

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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HATTELAND® DISPLAY

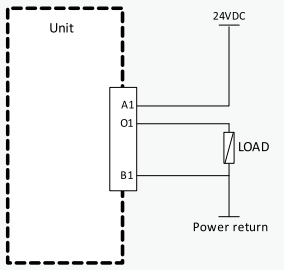
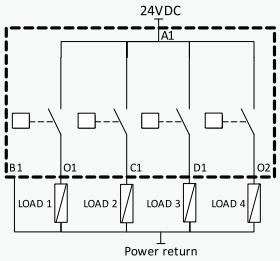
Manufacturer:	**Hatteland Display AS**
Product:	**Isolated Digital IO module (4 x Output + 4 x Input)**
Typenumber:	**HT 00268 OPT-A1**

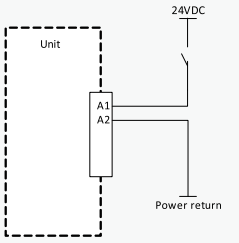
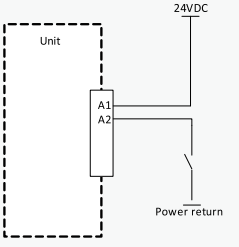
Last Revised:	**18 Apr 2013**
Revision#:	**02**

Isolated Digital IO module (4 x Output + 4 x Input)

Description:

The Hatteland Display DIO modules provide the system with 4 isolated digital output and 4 isolated digital input. The module is attached to the motherboard via USB interface. Application software access the DIO channels via D2XX interface provided by the chip manufacturer, i.e. in the normal case is there no requirements for low level software development. This module will mainly be integrated, electrical and mechanical, in the final products, such as; Series X 12, 13, 15, 17, 19, 24, 26 inch Panel Computers and selected Stand-alone Computers.

Digital Output		**Application Circuit**
• Features	- 4 x independent output channels, High side switch. - Outputs are short circuits and overload protected. - Thermal shutdown. - Isolated towards chassis. - Output status/diagnostic feedback available for each output channel. - Outputs is rated for inductive and resistive loads. - Outputs is rated for driving small motors. - Classified towards IEC60945 and IEC60950.	
• Maximum Ratings	- Voltage: 9-36V continuously. - Load Current: 0.5A up to 32V, 0.3A up to 36V. - Response time hardware for change of output state <20ms. - Response time hardware for diagnostic feedback <30ms.* - Worst case short circuit current (each channel) < 1.5A. *Typical response time at system level: 200ms.	
• Typical Application	- Low Power control / relay control. - Medium power buzzer. - Indicator/signal lamps.	**Above: High side switch concept**

Digital Input		**Application Circuits**
• Features	- 4 x independent input channels. - Fully isolated towards chassis and channel to channel. - Short circuit and reverse voltage protected. - Classified towards IEC60945 and IEC60950.	
• Maximum Ratings	- Input voltage 8-36V. - Response time hardware <10ms. - Input current < 20mA.	

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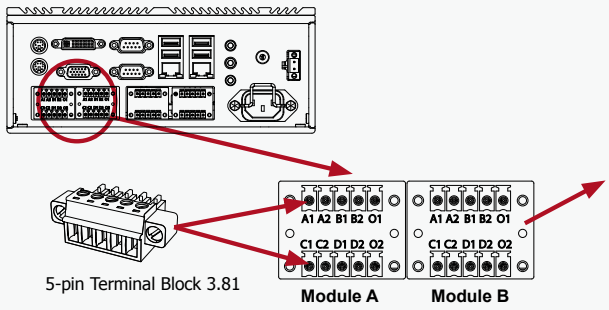
HATTELAND® DISPLAY

Additional	
• Cable connector	4 x Phoenix 1827732 (MC 1,5/ 5-STF-3,81) Terminal Block 3.81 (see illustration below)
• Test and certificate	Hatteland Display standard, (tested / type approved by the following classification societies): **IEC 60945 4th** (EN 60945:2002)*, **IACS E10***, **ClassNK** - Nippon Kaiji Kyokai*, **GL** - Germanischer Lloyd*, **DNV** - Det Norske Veritas*, **ABS** - American Bureau of Shipping*, **CCS** - China Classification Society*, **BV** - Bureau Veritas*, **LRS** - Lloyd's Register of Shipping* *=pending
• Safety IEC60950	The DIO module is intended to be used in control circuits and this module does therefore need external fuse to meet safety agency approvals.

Illustration and Pinning

Note: Product below for illustration only. Location of module and product size/design may differ. Connector/pinning/specifications remain the same.



Module A		Module B	
A1	External Power +	A1	IN+[0]
A2	N/C (Not Connected)	A2	IN-[0]
B1	External Power - (GND1)	B1	IN+[1]
B2	N/C (Not Connected)	B2	IN-[1]
O1	HS[0]	O1	N/C
C1	HS[1]	C1	IN+[2]
C2	N/C (Not Connected)	C2	IN-[2]
D1	HS[2]	D1	IN+[3]
D2	N/C (Not Connected)	D2	IN-[3]
O2	HS[3]	O2	N/C

Supported Operating Systems (OS)

Embedded Enterprise (WEE):	**Linux:**
- Microsoft® Windows® XP Professional (Eng, SP3, SP2c) - Microsoft® Windows® Server 2003/2008/2008R2 (Eng) - Microsoft® Windows® 2003/2008/2008R2 (Eng) - Microsoft® Windows® 7 Professional/Ultimate (Eng, SP1).	**-** openSUSE® 11.4, Fedora™ 15 - Ubuntu® 10.04 LTS - Ubuntu® 12.04 LTS

Currently supported D2XX Drivers

		Processor Architecture		
Operating System (OS)	**Release Date** (yyyy-mm-dd)	**x86 (32-bit)**	**x64 (64-bit)**	**Comments [Footnote]**
Microsoft® Windows®*	2013-02-20	2.08.28	2.08.28	2.08.28 WHQL Certified [*1] Release Notes [*2]
Linux	2012-06-29	1.1.12	1.1.12	[*3]

*includes the following versions of the Microsoft® Windows® operating systems:
Windows® XP, Windows® Server 2003, Windows® Vista, Windows® Server 2008, Windows® 7, Windows® Server 2008 R2 and Windows® 8.

For updated progress, please visit: http://www.ftdichip.com/Drivers/D2XX.htm

Footnotes:
[*1] = http://www.ftdichip.com/Drivers/CDM/CDM20828_Setup.exe
[*2] = http://www.ftdichip.com/Drivers/CDM/CDM 2 08 28 Release Info.rtf
[*3] = http://www.ftdichip.com/Drivers/D2XX/Linux/ReadMe-linux.txt

Specifications
Accessories

All specifications are subject to change without prior notice!

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HATTELAND® DISPLAY

Manufacturer:	**Hatteland Display AS**
Product:	**USB Cable 1m**
Type:	**JH C01MF A-A**

ACCESSORY

Last Revised:	**30 Nov 2011**
Revision#:	**01**

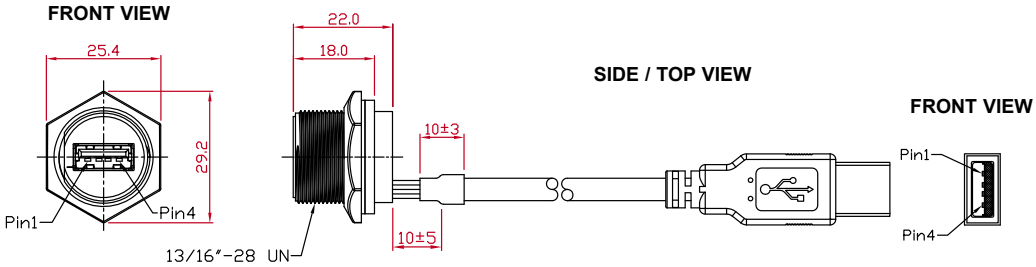
USB Cable

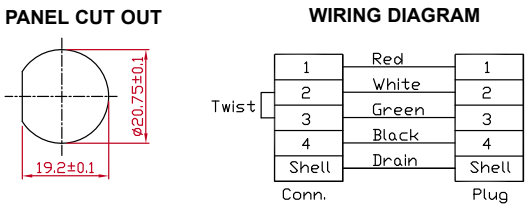
Description:

USB Cable (Type A plug to Chassis mount Type A receptacle) suitable for installations that feature a secure fastening connection from external equipment with standard Type A ports to all Hatteland Display computers and panel computers with standard USB Type A ports. RoHS Compliance.

Specifications

• Waterproof Rate	: IP67
• Recommended Panel Thickness	: 0.8 to 6.0 mm
• Recommended Torque	: 6~7 Kgf-cm
• Mating Cap P/N	: GT1C533122
• Over Mold	: Black color PVC
• USB Type A Plug	: Thermal plastic, black color housing : Copper Alloy contacts with AU Plated finish : Cold Roll Steel shell with NI Plated finish
• Cable	: 1m, UL2725 1P x 28AWG + 2C x 24AWG+Al/My+D+B, 5.0mm thickness, black color
• Shrink Tube	: L=10mm, Black color
• Receptacle Connector	: USB-A Plastic C3 Panel Jack screw with pig tail
• Type Approval / Testing	: Not tested, IEC60945 and IACS E10 pending





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HATTELAND® DISPLAY

Manufacturer:	**Hatteland Display AS**
Product:	**External Module USB (CAN/NMEA COM/COM/DIO)**
Typenumber:	**Based on internal modules, see table on page 2**

Last Revised:	**12 Jun 2013**
Revision#:	**02**

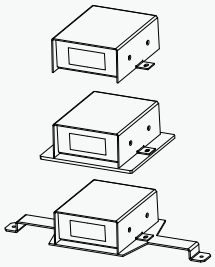
External Module USB (CAN/NMEA COM/COM/DIO)

Description:

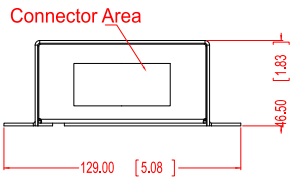
Hatteland Displays IO module series concept for marine applications adds more functionality to your Maritime Multi Computers and Maritime Stand-Alone computers. They are available as regular factory options for the entire range of Series X Maritime Multi Displays, Maritime Multi Computers and as well as the latest Maritime Stand-Alone computers.

In addition, the module concept has been taken further to a self contained and encased external USB module version. This provides flexibility for new installations and easy upgrade of already installed systems. In fact, any Hatteland Display product that has a USB2.0 port can take advantage of these External Modules for both legacy, obsoleted, current and future products as long as the software and firmware supports the Operating System. (note: CAN module is only supported for Series X and newer computers).

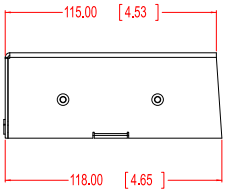
Fully compatible with all Hatteland Display latest generation products, external cased modules enable system integrators to benefit from the features of these internal options as an external and easy to connect solution. They interface via a standard USB Type A Cable and the chassis comes with its own mounting hinges. In addition a neat mounting bracket is available to secure the casing on the back of a Series X Panel PC product matching our VESA mounting holes of 75mm (8 and 13 inch) or 280mm (12, 15, 17, 19, 24 and 26 inch) models.



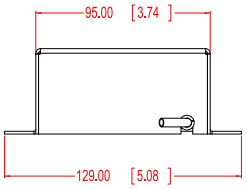
FRONT VIEW



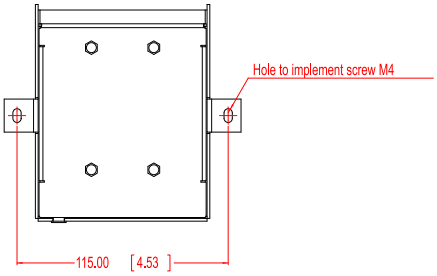
SIDE VIEW



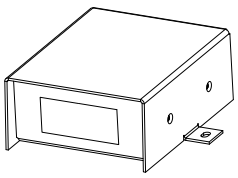
BACK VIEW



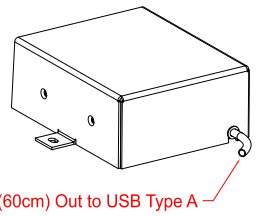
BOTTOM VIEW



DIMETRIC VIEW FRONT



DIMETRIC VIEW BACK



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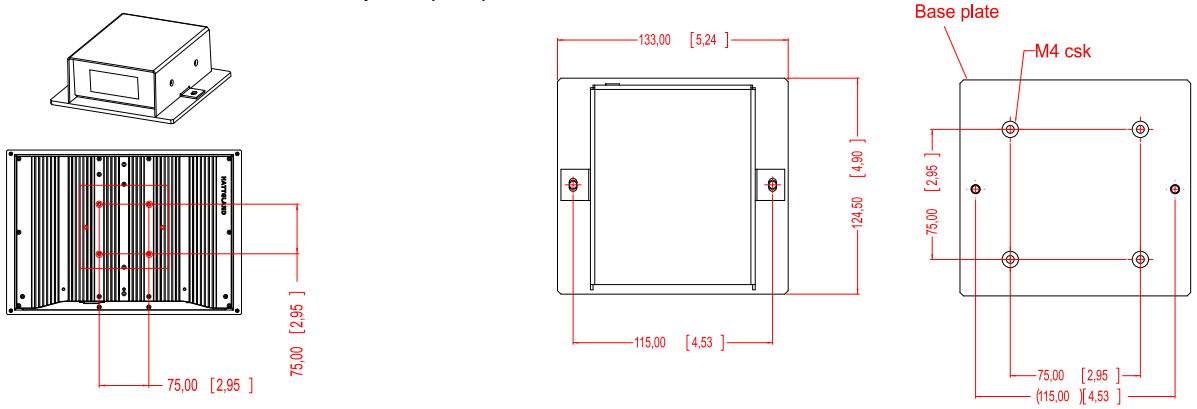
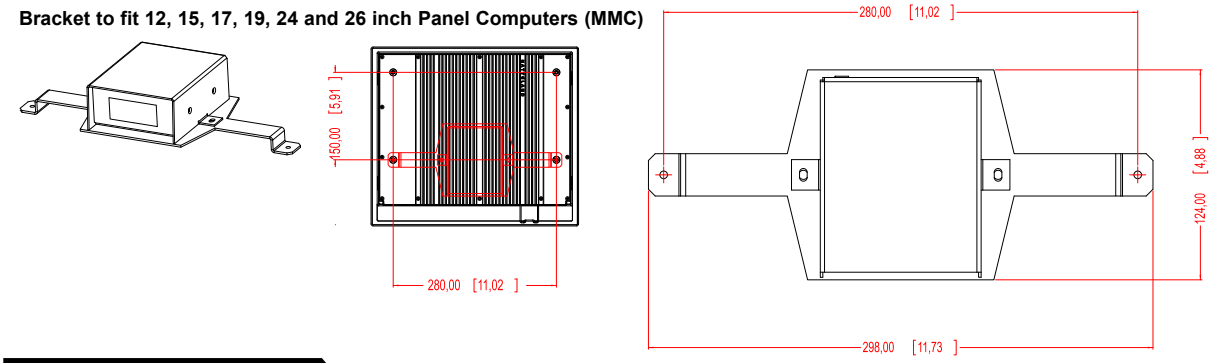
HATTELAND® DISPLAY

Bracket to fit 8 and 13 inch Panel Computers (MMC)



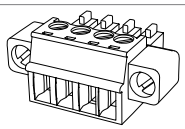
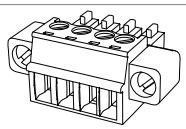
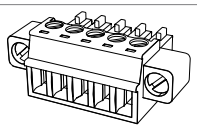
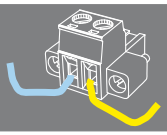
Bracket to fit 12, 15, 17, 19, 24 and 26 inch Panel Computers (MMC)



Ordering Details:

TypeNumber	Description	Internal Specifications (link to separate datasheets)
HT 00262 OPT-A1	**NMEA COM** 4 x NMEA RS-422/RS-485 isolated Via 5-pin Terminal Block 3.81 Connector	**(PCA100293-1)** www.hatteland-display.com/pdf/ind_ds/ds_pca100293-1_com_module_rs-422_rs-485.pdf
HT 00263 OPT-A1	**COM** 4 x RS-232 COM Via 4 x DB-9 Male Connector	**(PCA100294-1)** www.hatteland-display.com/pdf/ind_ds/ds_pca100294-1_com_module_rs-232.pdf
HT 00264 OPT-A1	**CAN** 1 x CAN isolated Via 4-pin Terminal Block 3.81 Connector	**(HT 00254 OPT-A1)** www.hatteland-display.com/pdf/ind_ds/ds_ht00254opt-a1_can_module.pdf
HT 00273 OPT-A1	**DIO** 4 x Digital Input isolated 4 x Digital Output Via Terminal Block 3.81 Connector	**(HT 00268 OPT-A1)** www.hatteland-display.com/pdf/ind_ds/ds_ht00268opt-a1_4x_digital_module.pdf
P012636	**Mounting Bracket Base** Suitable for 8 and 13 inch Uses VESA 75mm on unit	See drawings on this datasheet
A007330	**Mounting Bracket Base** Suitable for 12, 15, 17, 19, 24, 26 inch Uses VESA 280mm on unit	See drawings on this datasheet

Most modules interfaces by using Terminal Block type connectors from Phoenix or Weidmuller, as listed below:

			
For DIO Module Connection: 4-pin Phoenix 1827732 MC 1,5/ 5-STF-3,81	For CAN Module Connection: 4-pin Weidmüller 1792970000 BCZ 3.81/04/180F SN BK BX	For NMEA COM Module Connection 5-pin Phoenix 1827732 MC 1,5/ 5-STF-3,81	Secure cables with Screw Terminals

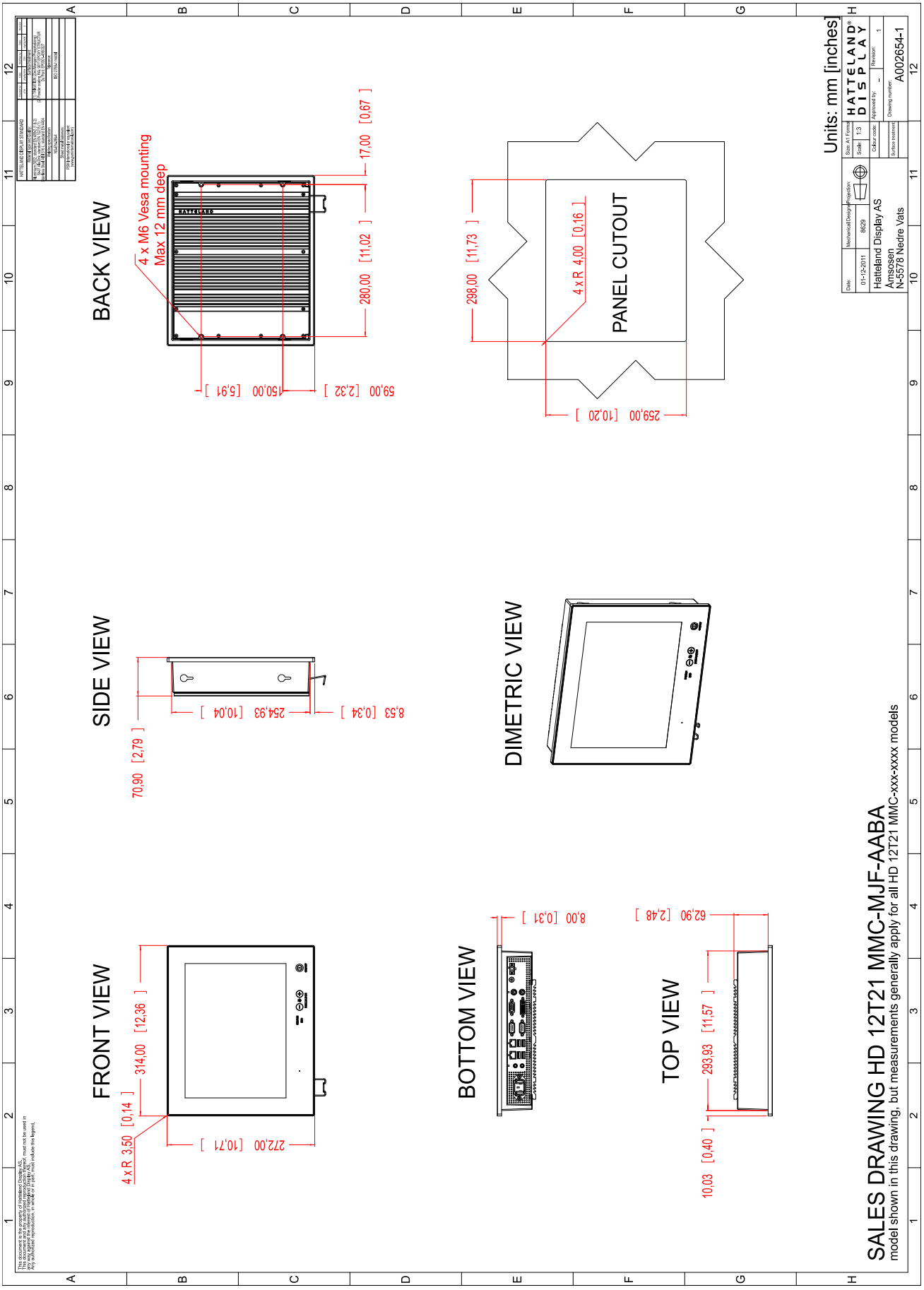
APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies: (*=pending)

IEC 60945 4th (EN 60945:2002)* **IACS E10*** **GL** - Germanischer Lloyd* **DNV** - Det Norske Veritas*
ABS - American Bureau of Shipping* **BV** - Bureau Veritas* **LRS** - Loyd's Register of Shipping* **ClassNK** - Nippon Kaiji Kyokai*

2/2

Technical Drawings



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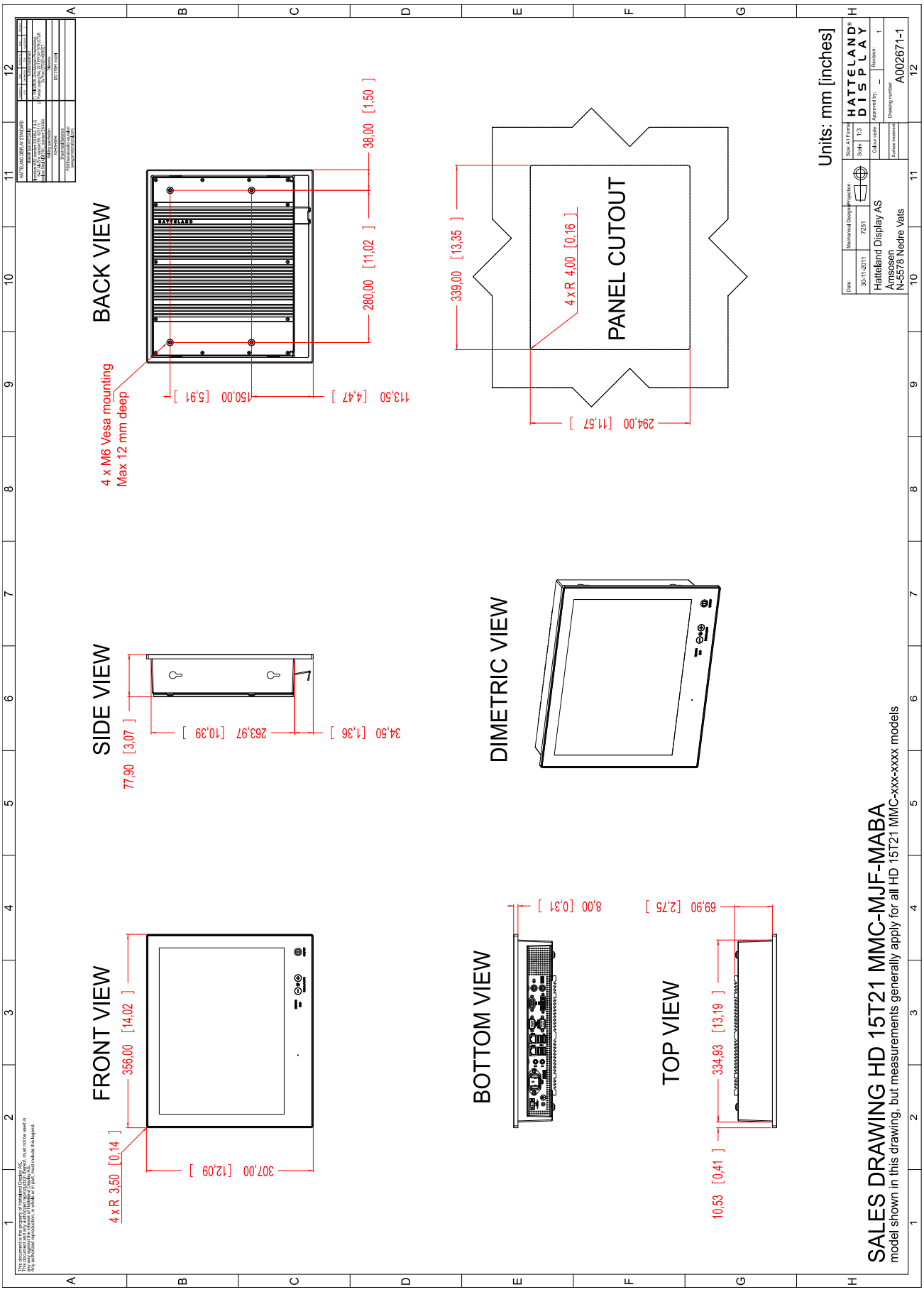

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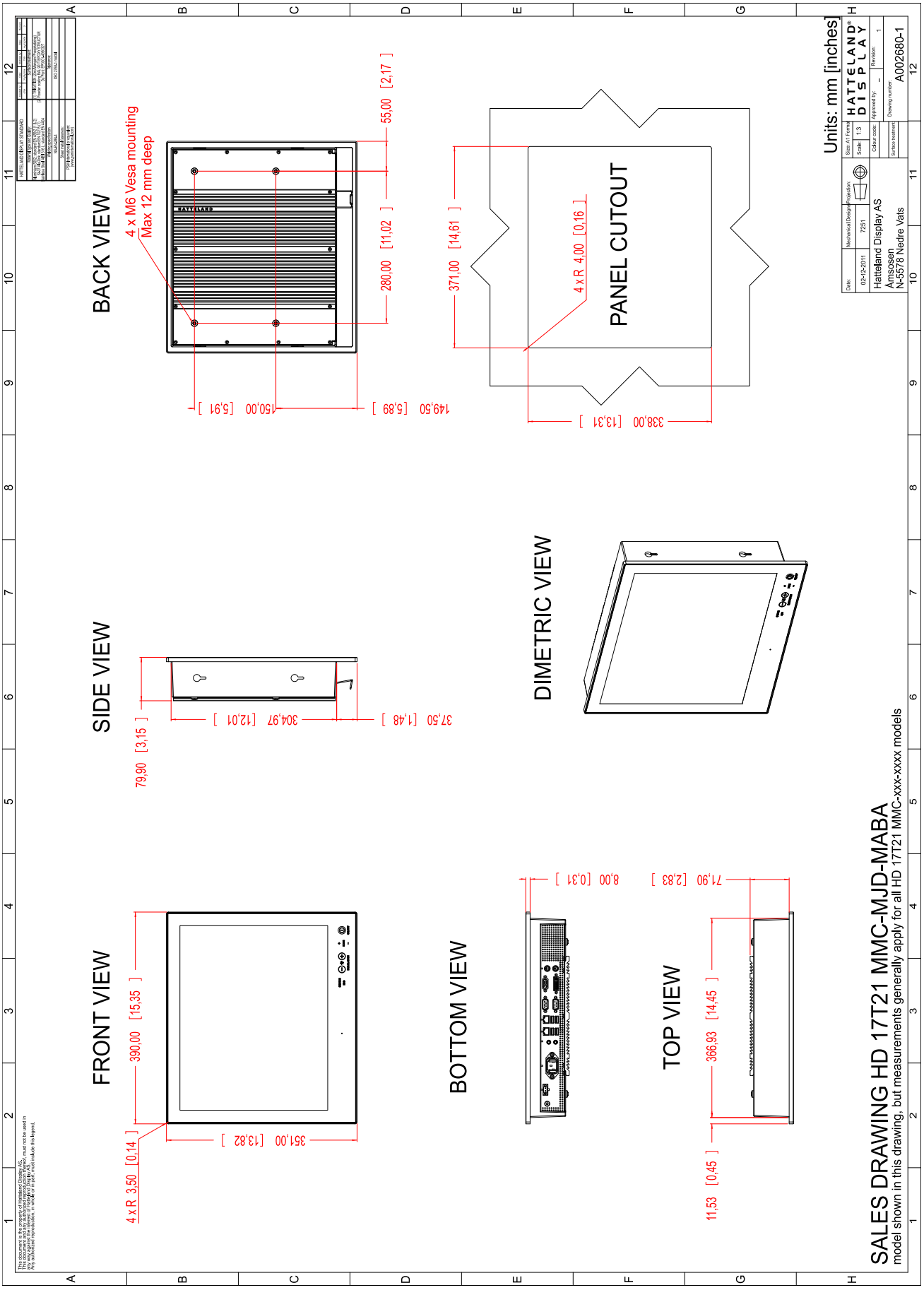

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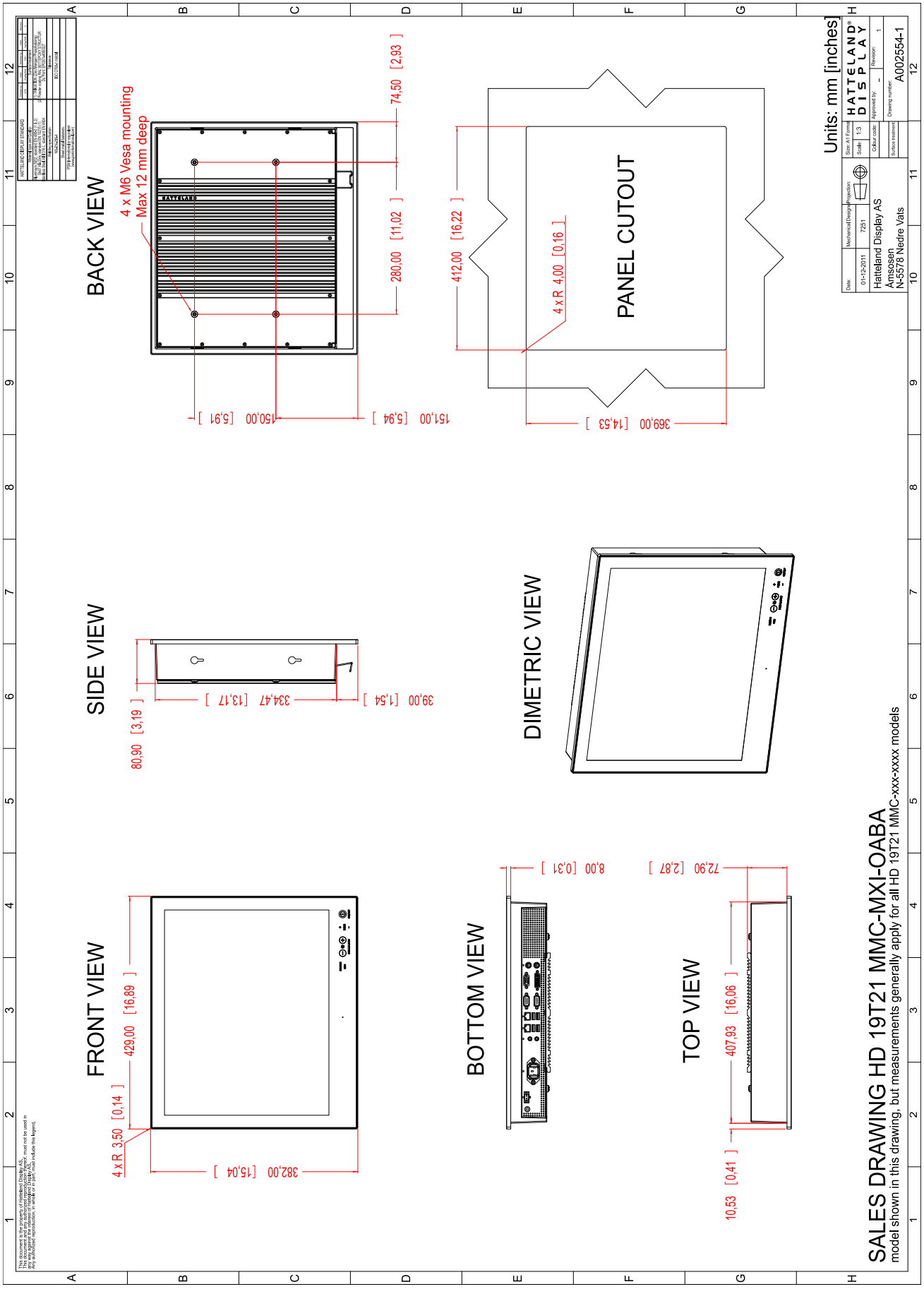

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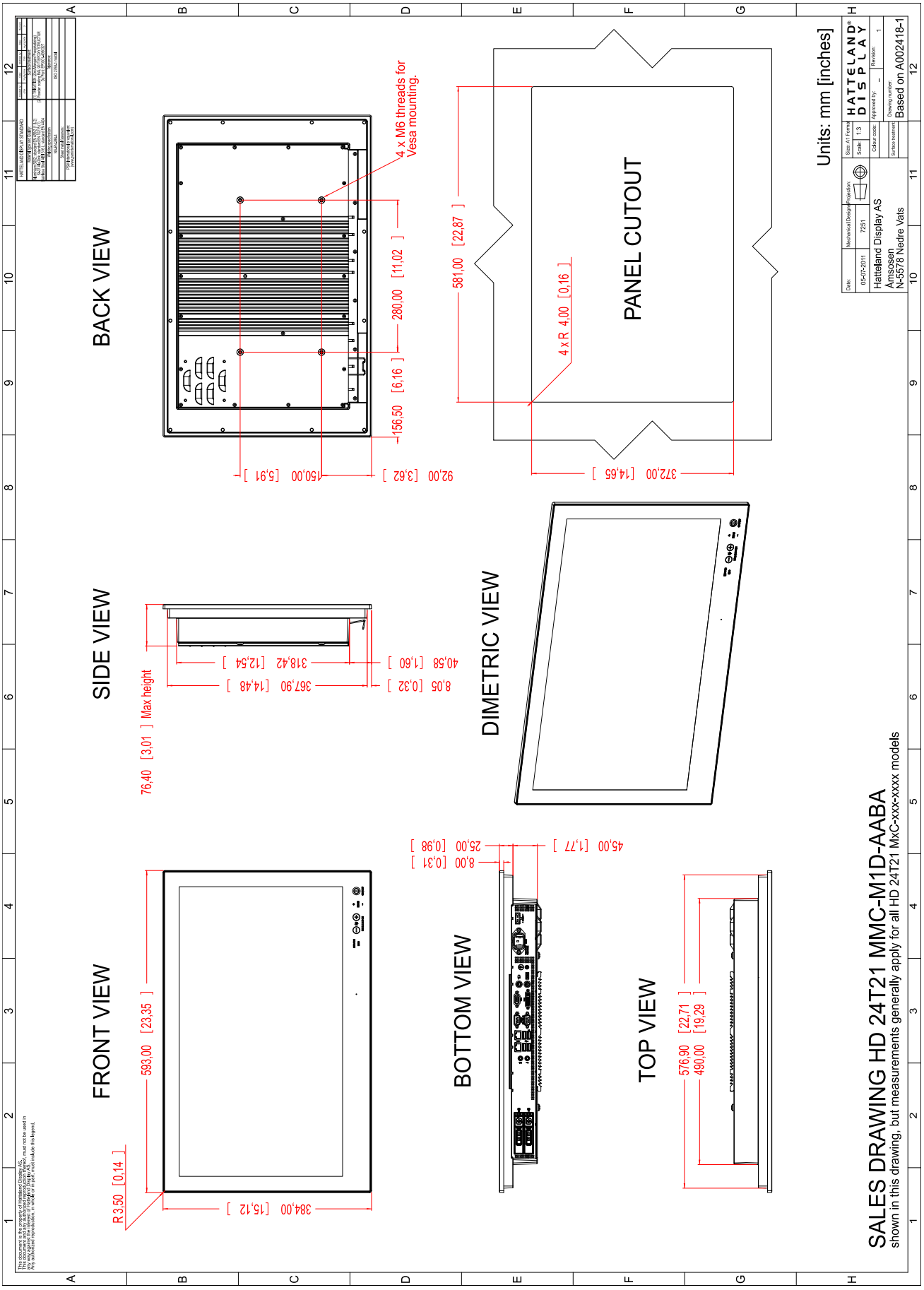

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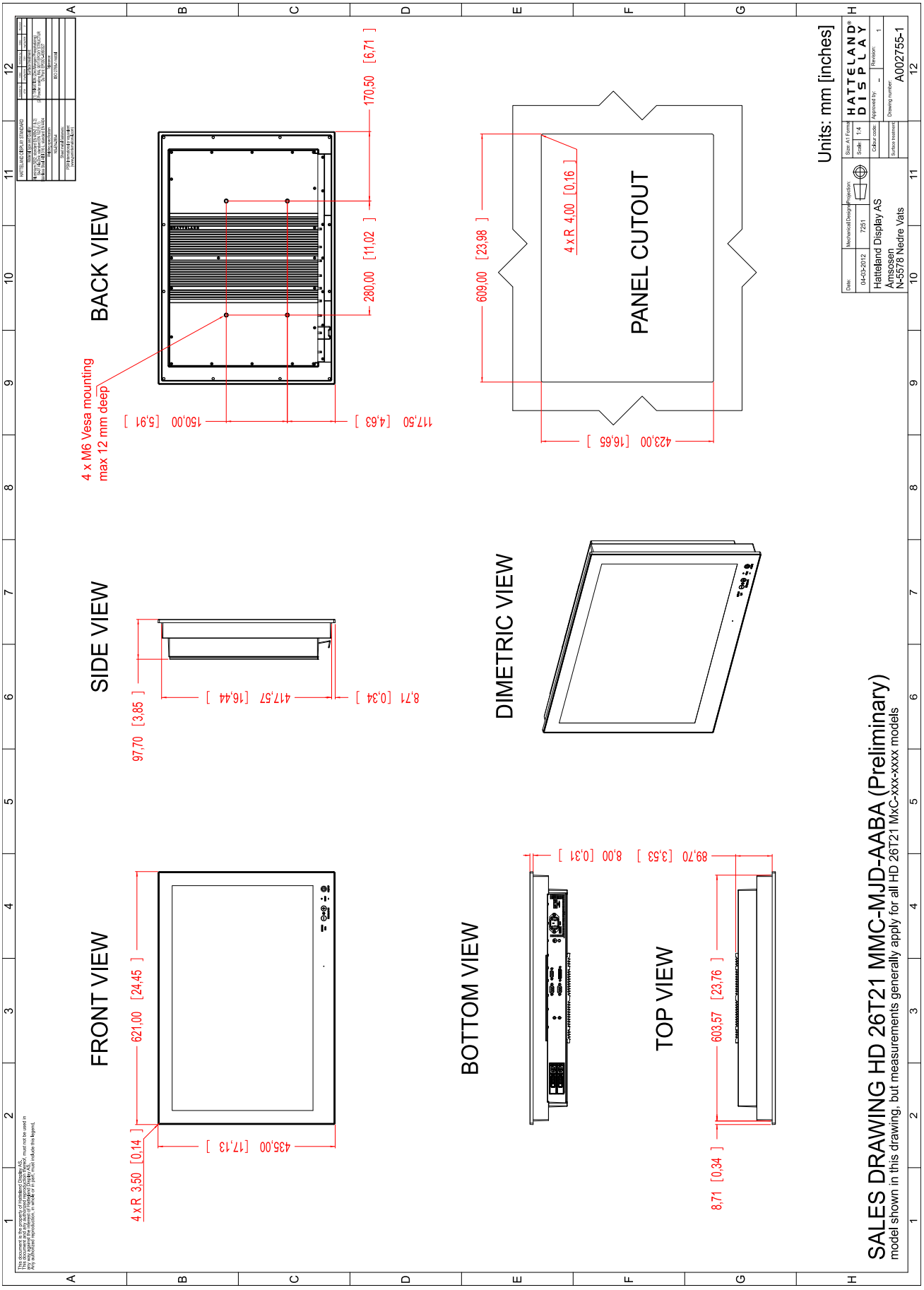

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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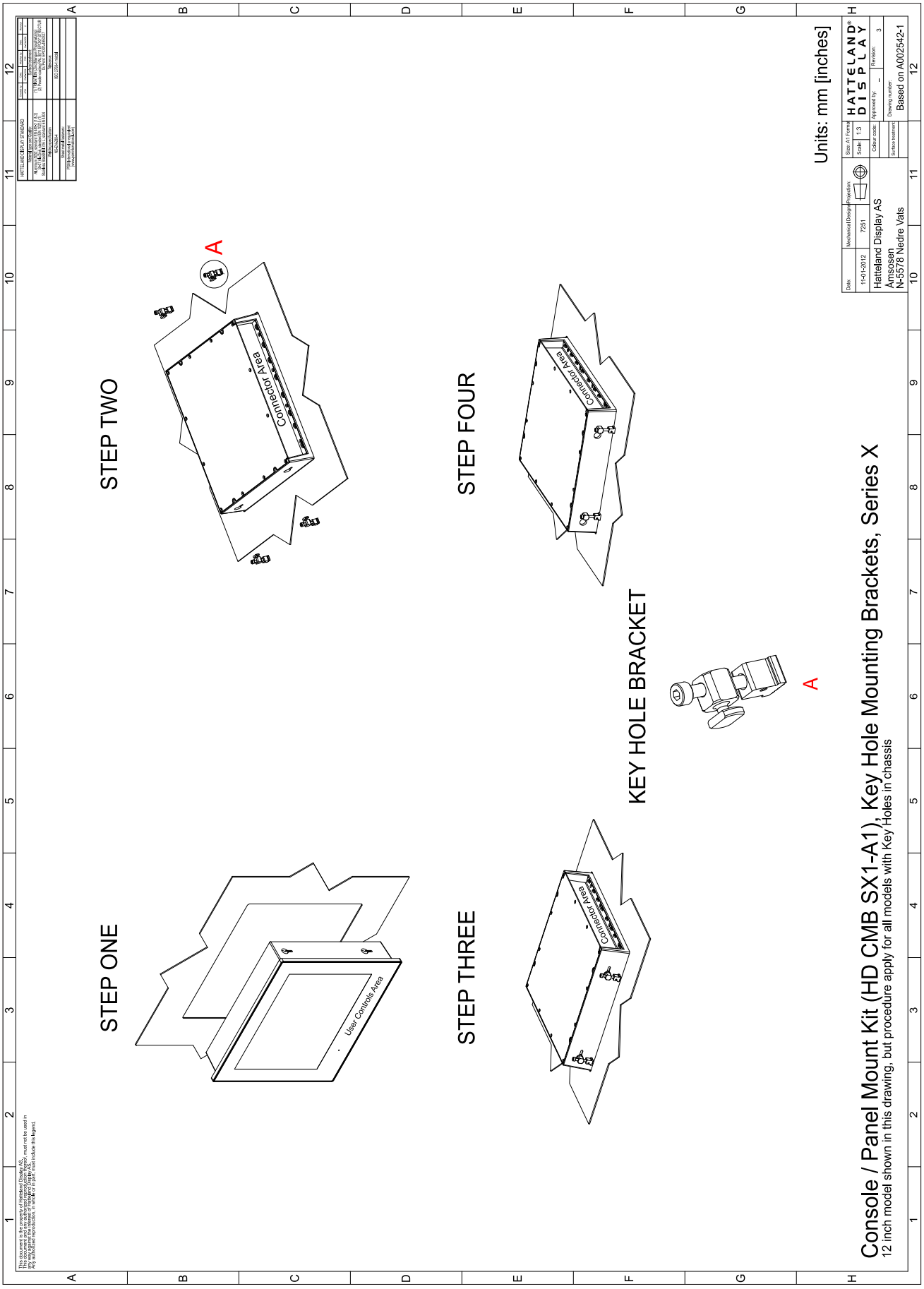
Technical Drawings - Accessories

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



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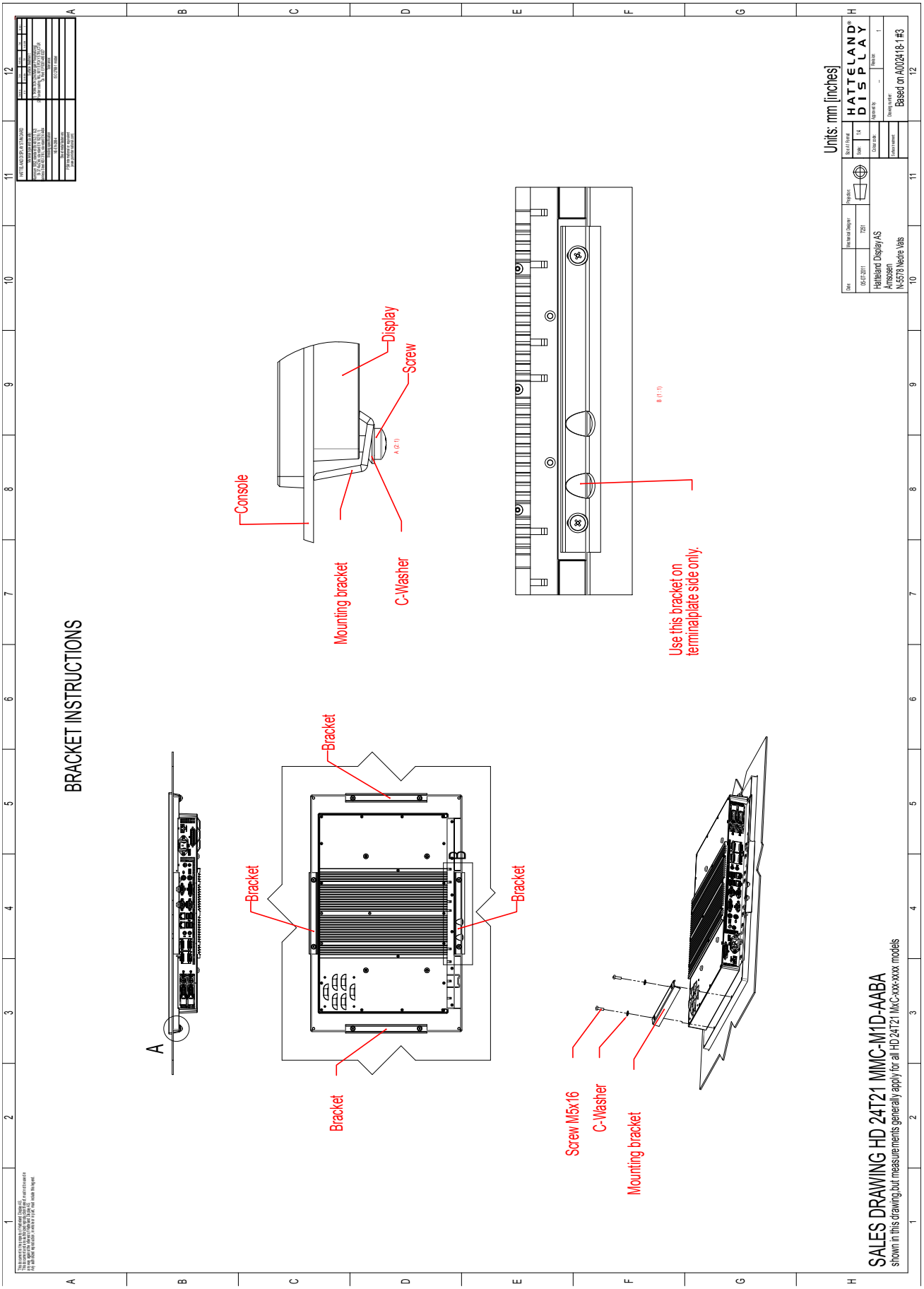

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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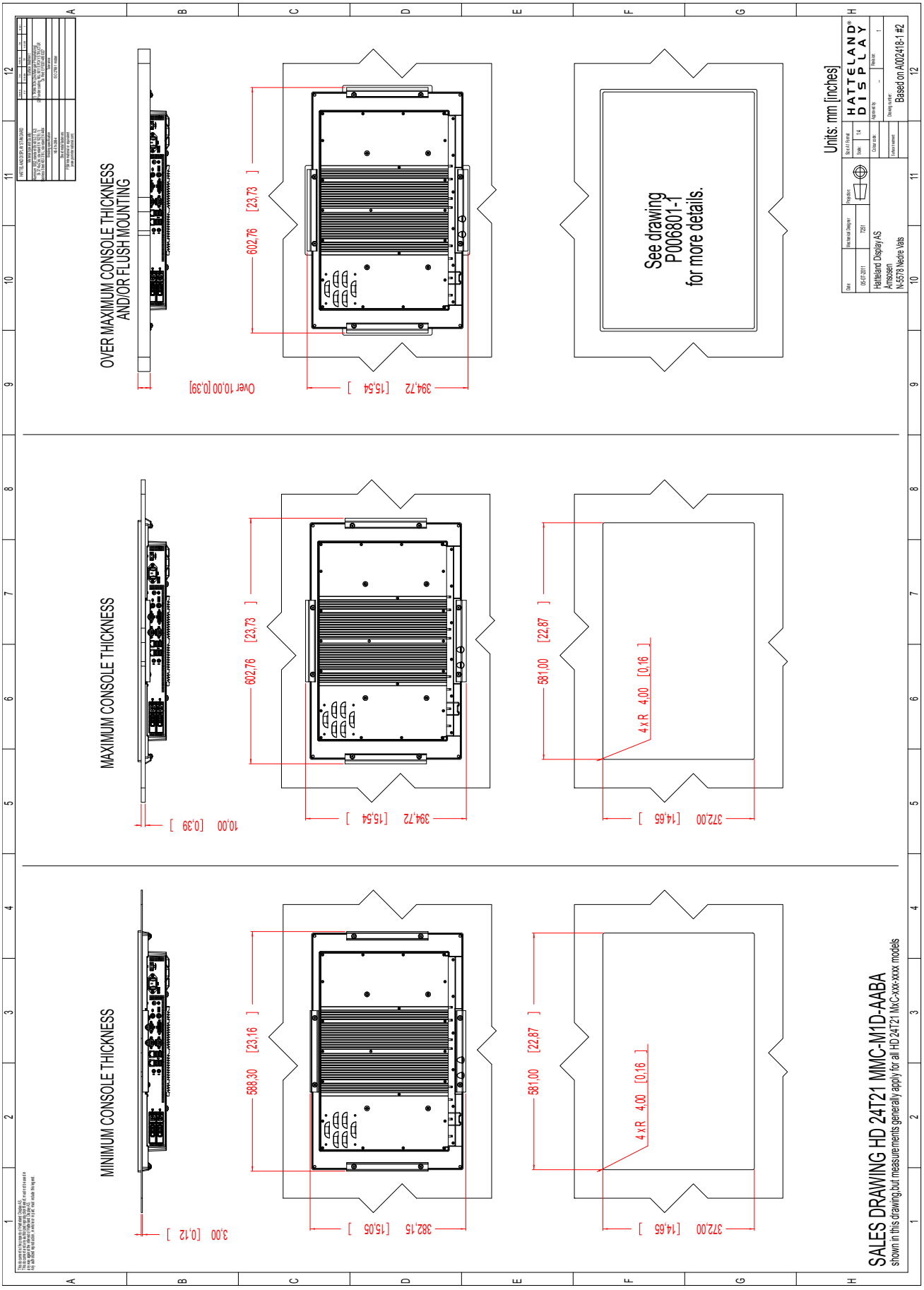

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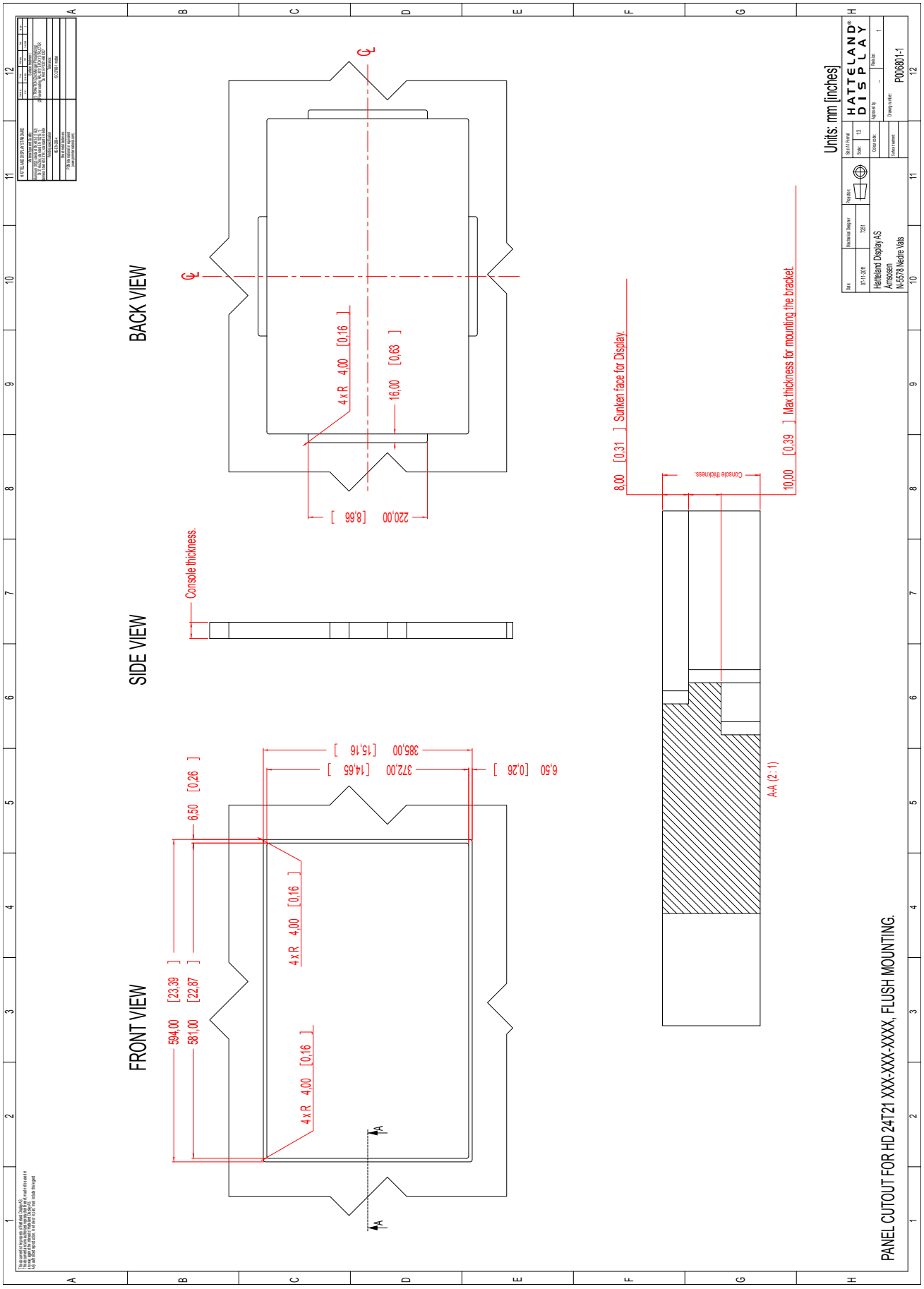

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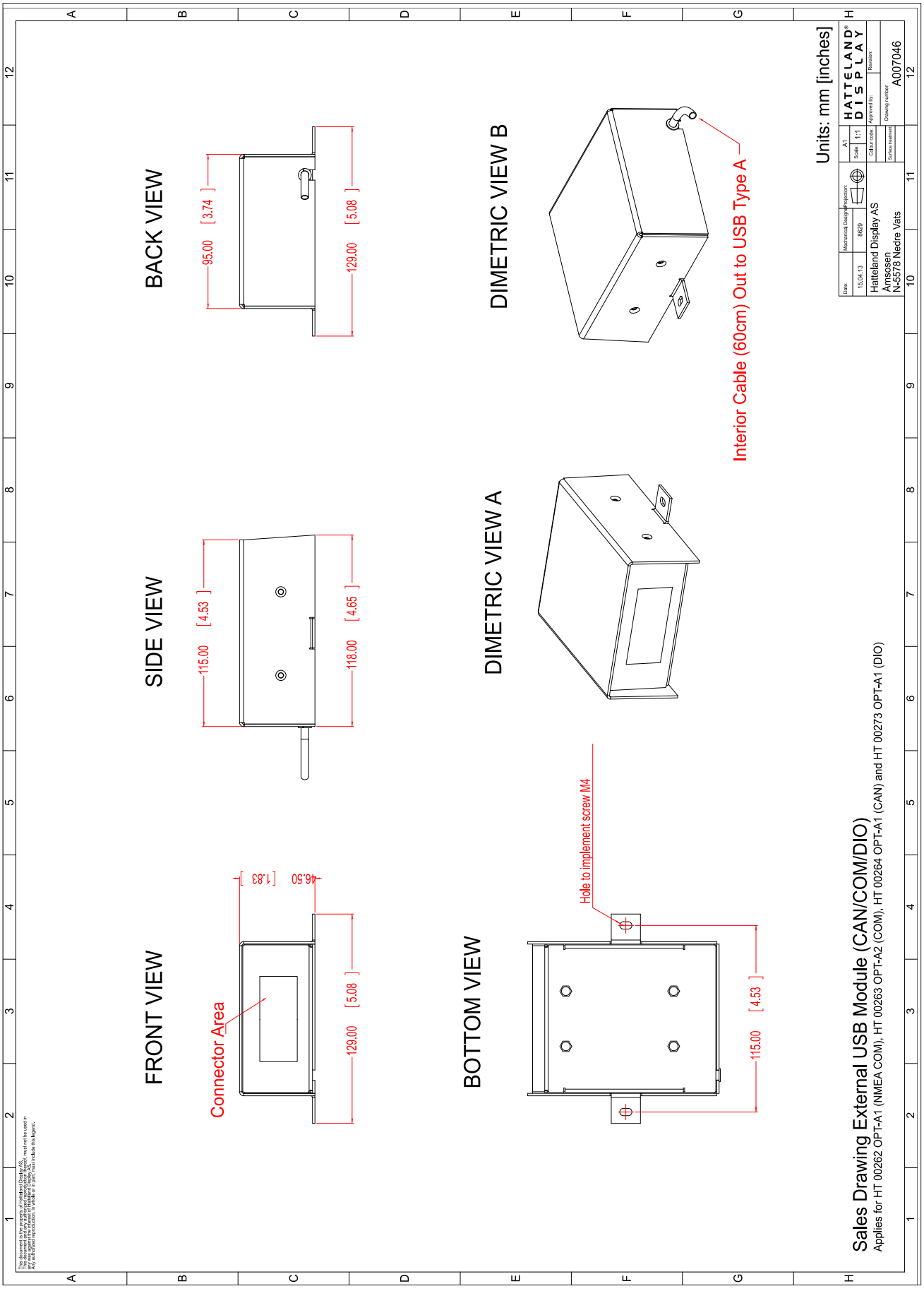

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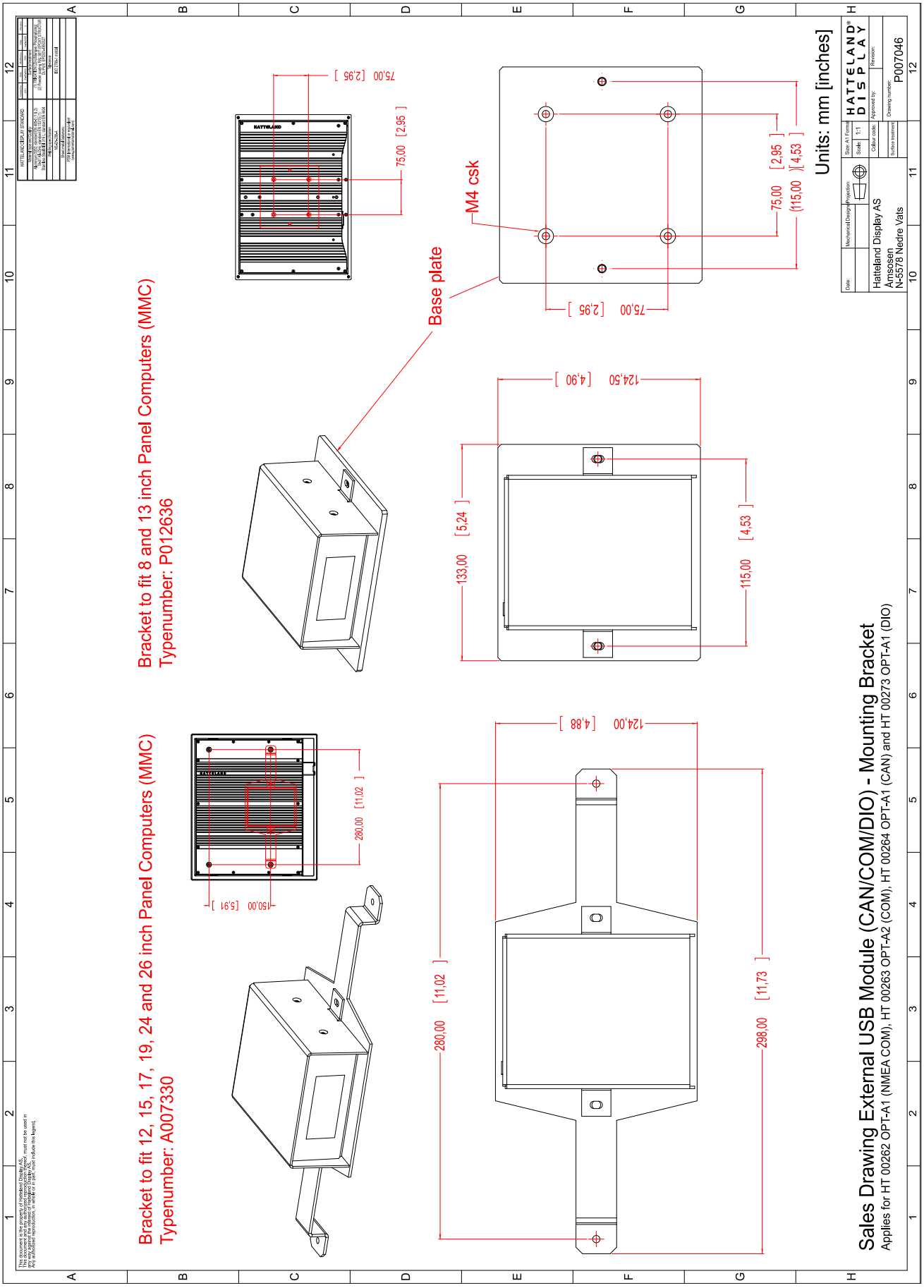
Units: mm [inches]
Sales Drawing External USB Module (CAN/COM/DIO) - Mounting Bracket
Applies for HT 00262 OPT-A1 (NMEA COM), HT 00263 OPT-A2 (COM), HT 00264 OPT-A1 (CAN) and HT 00273 OPT-A1 (DIO)
Bracket to fit 12, 15, 17, 19, 24 and 26 inch Panel Computers (MMC)
Typenumber: A007330
Bracket to fit 8 and 13 inch Panel Computers (MMC)
Typenumber: P012636
Base plate
M4 csk
Hatteland Display AS
Arnsosen
N-5578 Nedre Vats
P007046

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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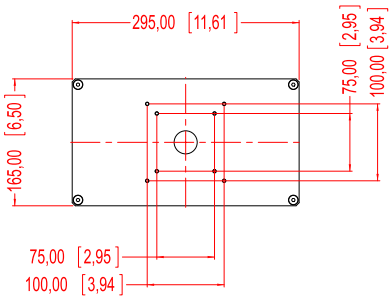
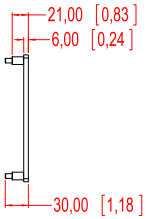
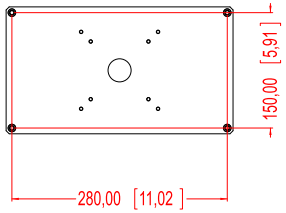
FRONT VIEW



SIDE VIEW



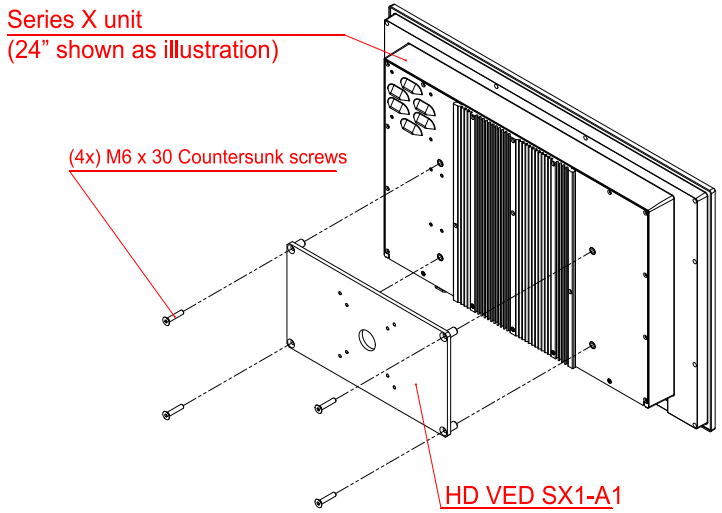
BACK VIEW



BOTTOM VIEW

TOP VIEW

MOUNTING OF VESA BRACKET



Units: mm [inches]

Date: 17.09.12	Mechanical Design: 7251	Projection:	A1 Scale: 1:3	HATTELAND® DISPLAY
Hatteland Display AS Åmsosen N-5578 Nedre Vats			Colour code:	Approved by: 7251 Revision: 02
			Surface treatment:	Drawing number: A006282

SALES DRAWING HD VED SX1-A1

This Vesa bracket applies for 12", 15", 17", 19", 24" and 26" Series X units.

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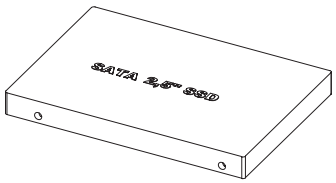
Appendixes

SSD Selection Guide

Solid State Disk (SSD) Devices

Last revised : 14 June 2013

SSD's has many benefits over conventional hard drives, but when it comes to write endurance it is important to choose the technology to be used with care. It is of very high importance to consider several aspects when using an SSD for a particular application, below the most critical ones, such as:



- **Nature of the application, data written to disk during a defined time period (worst case).**
- **Operating System (OS) and applications settings, optimized for SSD.**
- **SSD selection, there are several choices of price and performance.**
- **Expected system life, using worst case calculations.**

SSD devices have limited life time. The life time of the SSD device is direct dependent of the application software.

- **Selection / dimensioning of SSD device is required for each unique application.**
- **Selection / dimensioning of SSD device have to be done of the system house.**
- **Selection / dimensioning of SSD device shall be done towards data rate , size of footprint is secondary and in most cases not the dimensioning factor.**

Hatteland Displays Recommendations, MLC device

Use of OS image adapted for HDD without any modifications for SSD:
> Do not use SSD.

Basic SSD configuration of OS but not considered SSD in application SW and no estimation of amount of written data:
> Do not use SSD.

Basic SSD configuration of OS and basic consideration of SSD in application SW. Estimation based at guess, but actual amount of written data not known:
> Select next larger device, i.e if calculation gives 80GB, select 120GB instead.
> Minimum size 80GB.

Actual data known, based at measurements at actual application, running in worst case scenario:
> Select device according to calculation.

Calculation of required size of SSD (Multi-Level Cell - MLC) device)

The table below details the write endurance of the Intel® SSD 320 Series in an enterprise environment. Write endurance is measured while running 100% random 4KB (4096 bytes) writes spanning 100% of the drive using Iometer.

Write Endurance Specifications	
Intel® SSD 320 Series	**Value in TB (Terabytes)**
40 GB	5
80 GB	10
120 GB	15
160 GB	15
300 GB	30
600 GB	60

Formula for calculating disk size:
z = **y** * **x**

Where **y** = Requested minimum lifetime (with respect to wear out, [year]).
Where **x** = Data rate (GB /per year).
Where **z** = Total amount of data written data to SSD during its whole lifetime.

Step-by-Step Calculation

Step 1: Measure (preferred) or estimate data rate **y**, [GB /per year].
Step 2: Define minimum expected lifetime for SSD device **x** [year].
Step 3: Calculate total amount of data written to the SSD during its whole lifetime, **z** = **y** * **x**.
Step 4: Use table, **column 2**, the **z** value shall be less or equal to the value in the table to achieve requested lifetime.

Write Endurance Specifications	
Intel® SSD 320 Series	**Value in TB (Terabytes)**
40 GB	5
80 GB	**10**
120 GB	15
160 GB	15
300 GB	30
600 GB	60

Step 5: Select the SSD device, **column 1,** which corresponds to the selected value in **column 2**.
Step 6. Check that the size of the selected SSD is greater than required size of the SSD, if not select the size of the SSD that match customer requirements.

SSD Selection Guide

Example

A general assessment based on requirements to determine the most suitable SSD device. When these factors are known or specified in detail, we can calculate and conclude which SSD device is most suitable (see bottom of page).

Question	Client Answer
We need to know how much data is written to disk (worst case) during a known time period (per second, minute, hour etc.) and the nature of this data?	Chart Data : 2GB /Week Log/User Data: : 10kB /Sec Swap Data : 100kB /Sec
How much space is used on as fixed for your application?	40GB over : Chart Data Area (typical Chart size is 30GB) 1GB : Log Data and User Data area 4GB : Swap Area
How long time shall this disk work with no problems?	5 years

Example Calculation and Conclusion

Calculation / Estimation of data rate:

Step	Factors	Formula	Result
1	Chart Data: 2GB /Week	2GB * 52	= 104 GB /Year
	Log data and User Data: 10kB /Sec	10kB * 60 * 60 * 24 * 365	= 315 GB /Year
	Swap Data: 100kB /Sec	100kB * 60 * 60 * 24 * 365	= 3.15 TB /Year
		Total	= 3.57 TB/Year
2	Required lifetime:	5 years	
3	Calculate total amount of data written to the SSD during its whole lifetime:	3.57TB * 5	= 17.8 TB
4	Select Disk Using Table	Conclusion	= 300GB SSD Device shall be used.

Measure of number of write cycles (Intel® Solid-State Drive Toolbox software)

Download Software from: **https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=18455**

SSD Selection Guide

Preparation

1: Install "Intel® Solid-Sate Drive Toolbox" at target system.

2: Install the unit in valid configuration, i.e. the application shall running valid use case, if possible use worst case scenario (with respect to disk activity).

3: Before start of measurement, check and store actual SMART data.
- Start "Intel® Solid-Sate Drive toolbol".
- Refresh (button at home screen).
- Export SMART data, store current data at file (button at home screen).

Measurement

1: Check and save time for start test scenario.

2: Execute the test scenario long enough to cover all valid use cases which may affect disk activity. (Recommended measurement period is at least 1 week without interruption).

3: When the measurement is completed...
- Check and save time for completion of the test scenario.
- Start Intel® Solid-Sate Drive toolbox.
- Refresh (button at home screen).
- Export SMART data, store current data at file (button at home screen).

Calculation

1: Calculate number of written bytes during the measurement period, use E1 or F1 parameter (stored log file). Number of written bytes per second = (**F1**compleation - **F1**start) / (**Time**completion - **Time**start)

2: Convert to bytes per year.

3: Calculate expected life time (see previous time, section "Step-by-Step Calculation").

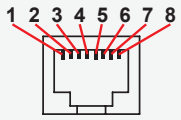
Pinout Assignments

ID's (1,2,3,A,B,C) denotes where connector is (by factory default) or may be available (through factory customization). Note that some combinations may not be possible due to space restrictions. List also valid for customized models. All pin out assignments are seen from users Point of View (POV) while looking straight at the connector. Please review the dedicated datasheet or technical drawings for your actual unit to identify and determine the presence of desired connector. Detailed information about Housing Connectors (terminal blocks) can be found earlier in this manual.

1	Available for MMD (Maritime Multi Displays) units.
2	Available for STD (Industrial Standard Displays) units.
3	Available for MMC (Maritime Multi Computers / Panel Computers) units and/or Maritime Stand-Alone Computers (Compact, Fanless, Rack).
A	For 8 / 13 inch sizes only
B	For 12 / 15 / 17 / 19 / 24 / 26 inch sizes only
C	Factory Option: For Maritime Stand-Alone Computers units only.

8-pin RJ45 10/100/1000mbps LAN/Ethernet

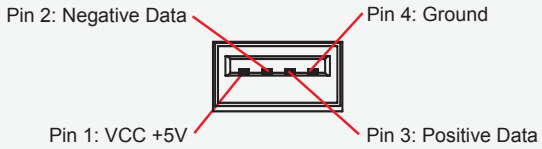
1 | 3 | A | B



PIN 01	D0P+	Differential Pair 0 (Positive)
PIN 02	D0N-	Differential Pair 0 (Negative)
PIN 03	D1P+	Differential Pair 1 (Positive)
PIN 04	D2P+	Differential Pair 2 (Positive)
PIN 05	D2N-	Differential Pair 2 (Negative)
PIN 06	D1N-	Differential Pair 1 (Negative)
PIN 07	D3P+	Differential Pair 3 (Positive)
PIN 08	D3N-	Differential Pair 3 (Negative)

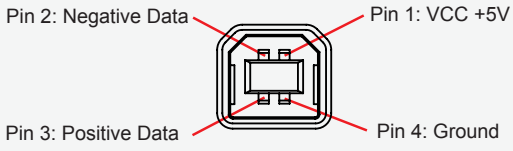
4-pin USB TYPE A

1 | 3 | A | B



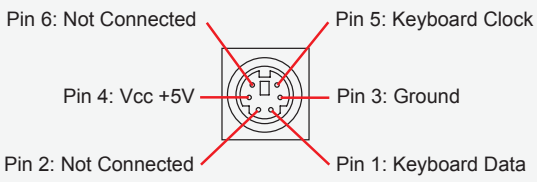
4-pin USB TYPE B

2 | A | B



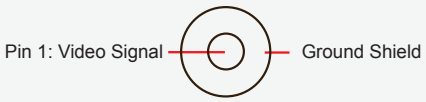
5-pin PS/2 KEYBOARD Female

3 | B



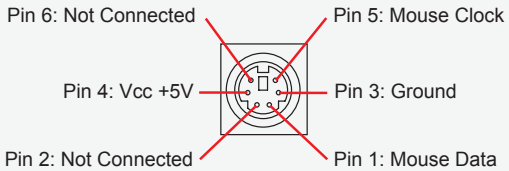
1-pin RCA/BNC COMP. VIDEO Female

1 | B



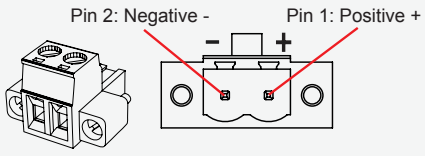
5-pin PS/2 MOUSE Female

3 | B



2-pin DC Power Input,

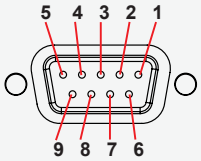
1 | 2 | 3 | A | B



9-pin Amplified Mono/Stereo Audio Out, DSUB Female

Type Number "HT 00235 OPT-A1"

3 | B

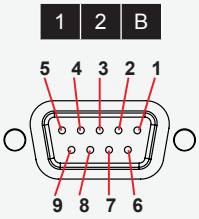


PIN 01	LAUDR	Left Audio Return*
PIN 02	LAUD	Left Audio*
PIN 03	RAUDR	Right Audio Return
PIN 04	RAUD	Right Audio
PIN 05	N/C	No internal connection
PIN 06	N/C	No internal connection
PIN 07	N/C	No internal connection
PIN 08	N/C	No internal connection
PIN 09	N/C	No internal connection

*For Mono: connect pin 01 and 02 only

Pinout Assignments

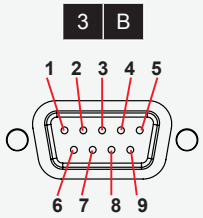
Serial COM RS-232 non-isolated, 9-pin DSUB Female



PIN 01	BUZ+	Buzzer Control Positive*
PIN 02	TxD	Transmit Data
PIN 03	RxD	Receive Data
PIN 04	DTR	Data Terminal Ready
PIN 05	GND	Ground
PIN 06	DSR	Data Set Ready
PIN 07	RTS	Request To Send
PIN 08	CTS	Clear To Send
PIN 09	BUZ-	Buzzer Control Negative*

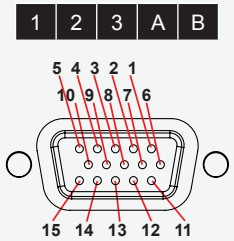
*Wake On Ring is not enabled

Serial COM RS-232 non-isolated, 9-pin DSUB Male



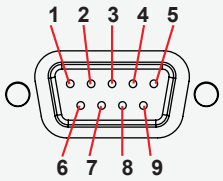
PIN 01	DCD	Data Carrier Detect
PIN 02	RxD	Receive Data
PIN 03	TxD	Transmit Data
PIN 04	DTR	Data Terminal Ready
PIN 05	GND	Signal Ground
PIN 06	DSR	Data Set Ready
PIN 07	RTS	Request To Send
PIN 08	CTS	Clear To Send
PIN 09	RI	Ring Indicator

Analog RGB/VGA, 15-pin DSUB High Density Female



PIN 01	RED	Red, analog
PIN 02	GREEN	Green, analog
PIN 03	BLUE	Blue, analog
PIN 04	ID2/RES	Reserved for monitor ID bit 2 (grounded)
PIN 05	GND	Digital ground
PIN 06	RED_RTN	Analog ground red
PIN 07	GREEN_RTN	Analog ground green
PIN 08	BLUE_RTN	Analog ground blue
PIN 09	KEY/PWR	+5V power supply for DDC (optional)
PIN 10	GND	Digital ground
PIN 11	ID0/RES	Reserved for monitor ID bit 0 (grounded)
PIN 12	ID1/SDA	DDC serial data
PIN 13	HSYNC.	Horizontal sync or composite sync, input
PIN 14	VSYNC.	Vertical sync, input
PIN 15	ID3/SCL	DDC serial clock

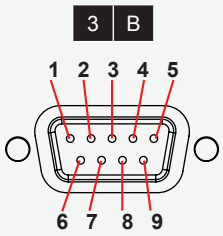
Serial COM RS-485/RS-422, 9-pin DSUB Male
"Full Duplex Mode*"



PIN 01	TxD-	Transmit Data Negative
PIN 02	TxD+	Transmit Data Positive
PIN 03	RxD+	Receive Data Positive
PIN 04	RxD-	Receive Data Negative
PIN 05	GND	Signal Ground
PIN 06	N/C	No internal connection
PIN 07	N/C	No internal connection
PIN 08	N/C	No internal connection
PIN 09	N/C	No internal connection

*Master only. ECHO not supported.

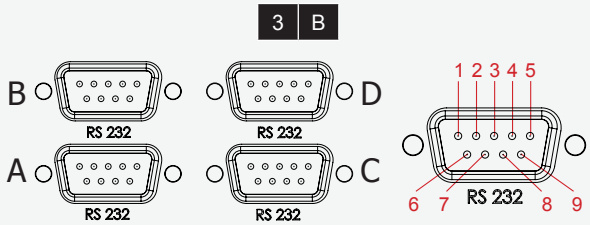
Serial COM RS-485/RS-422, 9-pin DSUB Male
"Half Duplex Mode*"



PIN 01	Res.	Reserved, do not connect
PIN 02	Res.	Reserved, do not connect
PIN 03	Data+	Data Positive
PIN 04	Data-	Data Negative
PIN 05	GND	Signal Ground
PIN 06	N/C	No internal connection
PIN 07	N/C	No internal connection
PIN 08	N/C	No internal connection
PIN 09	N/C	No internal connection

*ECHO not supported.
Half Duplex Configuration: Via Hatteland Display API.
Flow control: Via RTS signal (controlled by user application).

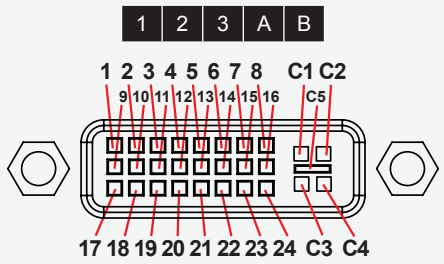
COM Module RS-232 - 4 x ports, 9-pin DSUB Male
Type Number "PCA100294-1"



PIN 01	DCD	Data Carrier Detect
PIN 02	RxD	Receive Data
PIN 03	TxD	Transmit Data
PIN 04	DTR	Data Terminal Ready
PIN 05	GND	Signal Ground
PIN 06	DSR	Data Set Ready
PIN 07	RTS	Request To Send
PIN 08	CTS	Clear To Send
PIN 09	RI	Ring Indicator

Pinout Assignments

18/24/24+5 pin DVI-D, DVI-I, Single Link, Dual Link Combined Female

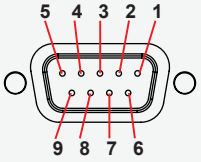


PIN 01	T.M.D.S. Data2 - (Digital - RED link 1)
PIN 02	T.M.D.S. Data2 + (Digital + RED link 1)
PIN 03	T.M.D.S. Data2/4 Shield
PIN 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
PIN 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
PIN 06	DDC Clock
PIN 07	DDC Data
PIN 08	Analog Vertical Sync (DVI-I only)
PIN 09	T.M.D.S. Data1 - (Digital - GREEN link 1)
PIN 10	T.M.D.S. Data1 + (Digital + GREEN link 1)
PIN 11	T.M.D.S. Data1/3 Shield
PIN 12	T.M.D.S. Data3 - (Digital - BLUE link 2)
PIN 13	T.M.D.S. Data3 + (Digital + BLUE link 2)
PIN 14	+5V Power (for standby mode)
PIN 15	Ground (for +5V and analog sync)
PIN 16	Hot Plug Detect
PIN 17	T.M.D.S. Data0 - (Digital - BLUE link 1) and digital sync.
PIN 18	T.M.D.S. Data0 + (Digital + BLUE link 1) and digital sync.
PIN 19	T.M.D.S. Data0/5 Shield
PIN 20	T.M.D.S. Data5 - (Digital - RED link 2)
PIN 21	T.M.D.S. Data5 + (Digital - RED link 2)
PIN 22	T.M.D.S. Clock Shield
PIN 23	T.M.D.S. Clock + (Digital clock + (Links 1 and 2)
PIN 24	T.M.D.S. Clock - (Digital clock - (Links 1 and 2)
PIN C1	Analog RED
PIN C2	Analog GREEN
PIN C3	Analog BLUE
PIN C4	Analog Horizontal Sync.
PIN C5	Analog Ground (return for RGB signals)

DDC = Display Data Channel.
.M.D.S = Transition Minimized Differential Signal
PIN C1,C2,C3,C4 = Only present on DVI-I connectors.

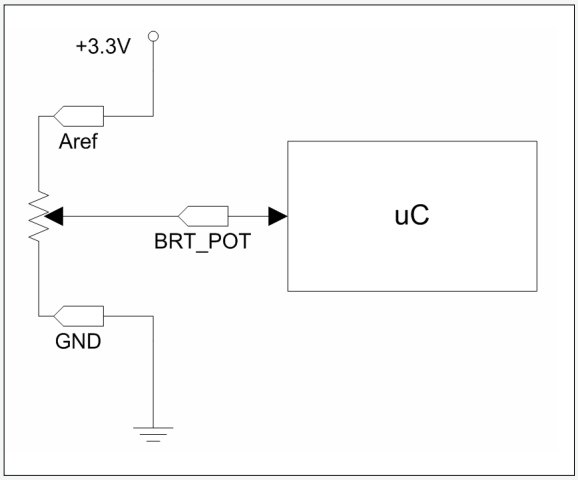
NOTE: Connector shows a DUAL LINK design, but some units may not support it. Only units with 1920x1200 or more in resolution require / support DUAL LINK.

Potmeter Control, 9-pin DSUB Male

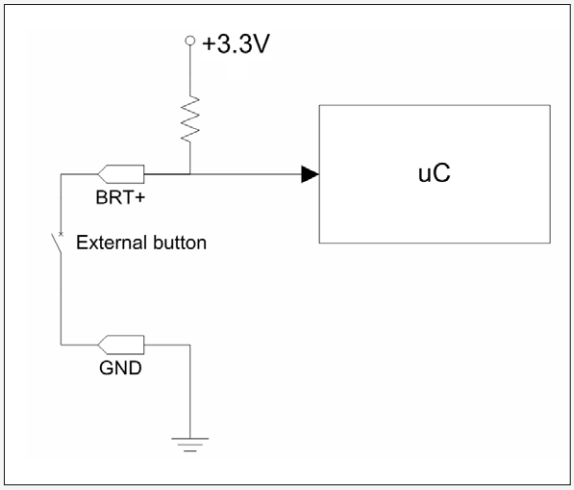


PIN 01	+5V	+5V out
PIN 02	Res.	Reserved, do not connect
PIN 03	Res.	Reserved, do not connect
PIN 04	Aref	For potensiometer
PIN 05	+12V	+12V out
PIN 06	BRT_POT	Potmeter in
PIN 07	BRT –	Button in
PIN 08	BRT+	Button in
PIN 09	GND	Ground

Potentiometer shall be 10kΩ and connected like this illustration below:



The BRT+ and BRT- can be used for controlling the brilliance by using external buttons. Example for the BRT+ input below:

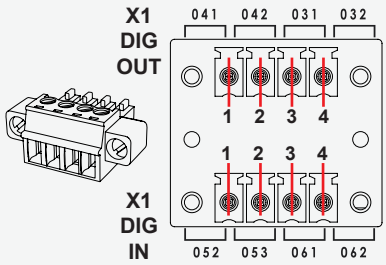


Pinout Assignments

8-pin Digital Output / Input Module

"Solid State Relay"

3 | A



Pin 01	X1 - Out: **41**	Out +
Pin 02	X1 - Out: **42**	Out -
Pin 03	X1 - Out: **31**	COM (Common Center Terminal) *
Pin 04	X1 - Out: **32**	NC (Normally Closed)*

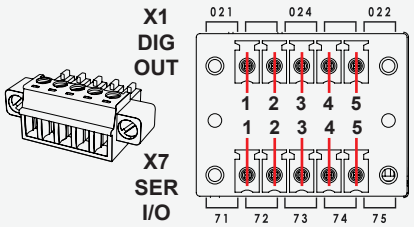
* IEC 60950 Compliant, 48VDC

Pin 01	X1 - In: **52**	+24VDC
Pin 02	X1 - In: **53**	GND (Ground)
Pin 03	X1 - In: **61**	+24VDC
Pin 04	X1 - In: **62**	+Input

10-pin Digital Output / Input & Serial Module

"Mechanical Relay & COM (isolated RS-422/485)"

3 | A



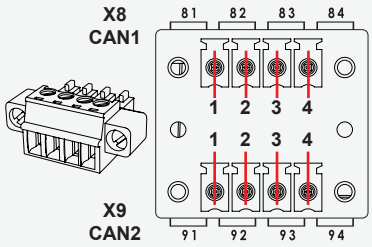
PIN 01	X1 - Out: **21**	COM (Common Center Terminal)
PIN 02	X1 - N/C	*Not Connected / Not used*
PIN 03	X1 - Out: **24**	NO (Normally Open)
PIN 04	X1 - N/C	*Not Connected / Not used*
PIN 05	X1 - Out: **22**	NC (Normally Closed)

PIN 01	X7 - In: **71**	Rx+ (Receive Data +)
PIN 02	X7 - In: **72**	Rx- (Receive Data -)
PIN 03	X7 - Out: **73**	Tx+ (Transmit Data +)
PIN 04	X7 - Out: **74**	Tx- (Transmit Data -)
PIN 05	X7 - GND: **75**	SGnd (Signal Ground)

4+4 pin CAN I/O Module, 2 channels

Type Number "HT 00254 OPT-A1"

3 | A | B



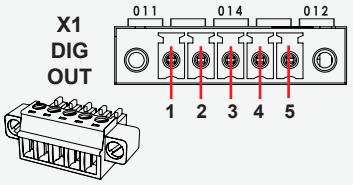
Pin 01	X8 - Can1: **81**	In Low
Pin 02	X8 - Can1: **82**	Out Low
Pin 03	X8 - Can1: **83**	In High
Pin 04	X8 - Can1: **84**	Out High

Pin 01	X9 - Can2: **91**	In Low
Pin 02	X9 - Can2: **92**	Out Low
Pin 03	X9 - Can2: **93**	In High
Pin 04	X9 - Can2: **94**	Out High

5-pin Digital Output Module

"Safety Signal Relay"

3 | A

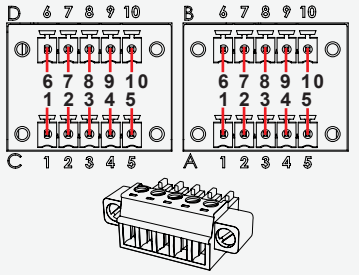


PIN 01	X1 - Out: **11**	COM (Common Center Terminal)
PIN 02	X1 - N/C	*Not Connected Not in use*
PIN 03	X1 - Out: **14**	NO (Normally Open)
PIN 04	X1 - N/C	*Not Connected Not in use*
PIN 05	X1 - Out: **12**	NC (Normally Closed)

10+10 pin RS-422 / RS-485 NMEA Module

Type Number "PCA100293-1"

3 | A | B



PIN 01	TxD-	Transmit Data Negative
PIN 02	TxD+	Transmit Data Positive
PIN 03	GND	Isolated Ground
PIN 04	RxD-	Receive Data Negative
PIN 05	RxD+	Receive Data Positive
PIN 06	TxD-	Transmit Data Negative
PIN 07	TxD+	Transmit Data Positive
PIN 08	GND	Isolated Ground
PIN 09	RxD-	Receive Data Negative
PIN 10	RxD+	Receive Data Positive

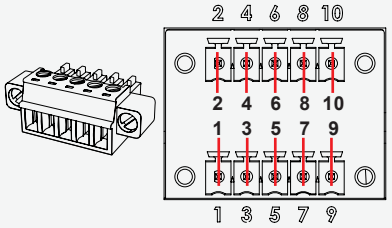
RS-485 Half Duplex (2-wire) Configuration:
Connect TX and RX pair-wise:
TX- to RX-, TX+ to RX+.

*Note: The jumper for "force of transmitter" is open by factory default. For some custom models this jumper is preset to closed (active), in that case unit has to be opened and jumper set to open to allow Half Duplex mode.

10-pin RS-422 / RS-485 Module

"RS-422/RS-485 SCOM Buzzer"

1 | 2 | B

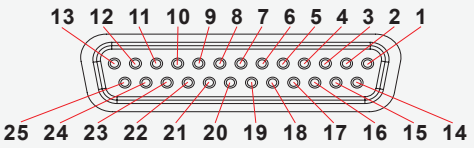


PIN 01*	RxD+	Receive Data Positive
PIN 02	GND	Ground
PIN 03*	RxD-	Receive Data Negative
PIN 04	+5V	+5V Out
PIN 05*	TxD+	Transmit Data Positive
PIN 06	BUZ-	Buzzer Control Negative
PIN 07*	TxD-	Transmit Data Negative
PIN 08	BUZ+	Buzzer Control Positive
PIN 09	GNDR	Ground 100Ω
PIN 10	GND	Ground

*Pin 1,3,5,7 = RS-485 Full Duplex (4-wire)
*Pin 5,7 = RS-485 Half Duplex (2-wire)

Pin Assignments - 25-pin Female Parallel (Optional for selected computers)

3 C

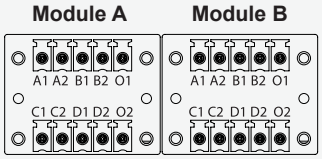


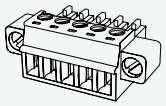
Pin 01	STROBE	This signal indicates to the printer that data at PD7..0 are valid.
Pin 02	DATA0	Parallel data bus from PC board to printer. The data line are able to operate in PS/2 compatible bi-directional mode.
Pin 03	DATA1	Same as Pin 02
Pin 04	DATA2	Same as Pin 02
Pin 05	DATA3	Same as Pin 02
Pin 06	DATA4	Same as Pin 02
Pin 07	DATA5	Same as Pin 02
Pin 08	DATA6	Same as Pin 02
Pin 09	DATA7	Same as Pin 02
Pin 10	ACK	Signal from printer indicating that the printer has received the data and is ready to accept further data.
Pin 11	BUSY	Signal from printer indicating that the printer cannot accept further data.
Pin 12	PE	Signal from printer indicating that the printer is out of paper.
Pin 13	SELECT	Signal from printer to indicate that the printer is selected.
Pin 14	AUTO FEED	This active low output causes the printer to add a line feed after each line printed.
Pin 15	ERR#	Signal from printer indicating that an error has been detected.
Pin 16	INIT#	This active low output initialises (resets) the printer.
Pin 17	SLIN#	Signal to select the printer sent from CPU board to printer.
Pin 18	GND	Ground
Pin 19	GND	Ground
Pin 20	GND	Ground
Pin 21	GND	Ground
Pin 22	GND	Ground
Pin 23	GND	Ground
Pin 24	GND	Ground
Pin 25	GND	Ground

10+10 pin Isolated Digital Input/Output Module

Type Number “HT00268 OPT-A1”

3 C





Module A			Module B	
A1	External Power +		A1	IN+[0]
A2	N/C (Not Connected)		A2	IN-[0]
B1	External Power - (GND1)		B1	IN+[1]
B2	N/C (Not Connected)		B2	IN-[1]
O1	HS[0]		O1	N/C
C1	HS[1]		C1	IN+[2]
C2	N/C (Not Connected)		C2	IN-[2]
D1	HS[2]		D1	IN+[3]
D2	N/C (Not Connected)		D2	IN-[3]
O2	HS[3]		O2	N/C

GENERAL ISSUES FOR TFT PANEL BASED PRODUCTS

Note: Applies for a range of various products. This is only meant as a general guide.

NO PICTURE / LED BEHAVIOUR:
If there is no light at all in the LED at the FRONT, check power cables. If the LED in front is green then check if the brightness is set/adjusted to max brightness. Lack of image is most likely to be caused by incorrect connection, lack of power or wrong BIOS settings.

SCROLLING / UNSTABLE IMAGE:
Signal cable may not be completely connected to computer or TFT display. Check the pin assignments and signal timings of the display and your video card with respect to recommended timing and pin assignments. Make sure that the video card is compatible and that it is properly seated / installed on the computer.

DISPLAY AREA IS NOT CENTERED / SIZED CORRECTLY
Make sure that a supported video mode has been selected on the display, or on the video card / system. If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test it again using another graphics card for the PC system. This situation may occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal, such as a signal splitter (please note that normally a signal splitter will not have any adverse effect). If it is impossible to change to the correct resolution/color depth, check if you have the right graphics driver installed in your system.

IMAGE APPEARANCE:
A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image. Incorrect graphic card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, it may scroll, flicker badly or possibly even no image is present. Sparkling on the display may be a faulty TFT panel signal cable, and it needs service attention.

RGB Signal Only: Horizontal interference can usually be corrected by adjusting the PHASE (OSD menu).
Vertical interference can usually be corrected by adjusting the FREQUENCY (OSD menu).

DEW CONDENSATION BEHIND GLASS:
Note that this problem will not occur on bonded products. For non-bonded products, do the following:
Power on the TFT product and set brightness to 100%. Turn off any automatic screensavers on PC or similar. During minutes the dew will be gone. To speed up the process, use a fan heater for a reasonable time. Do not overheat the unit.

GENERAL ISSUES FOR COMPUTER BASED PRODUCTS

Note: Applies for a range of various products. This is only meant as a general guide.

CD-ROM FAILURE OR READ/DETECTION PROBLEMS:
If the product are operated/located in a area with extreme condensation, the CD/DVD drive may not work correctly due to condensation on the read head. Keep the product on for a while until it’s reached normal operating temperature, and retry accessing discs. Otherwise, consider using USB memory sticks or alternative storage devices.

NO CD-ROM AVAILABLE ON YOUR PRODUCT FOR INSTALLING DRIVERS/SOFTWARE:
Please use USB memory sticks, USB Floppy drive, USB CD-Rom Drive or alternative storage devices to transfer/install software on CD-ROM-less units.

HATTELAND®
DISPLAY

Declaration of Conformity

We, manufacturer, **Hatteland Display AS,** Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the
JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD, HT MMC and HD MMC product ranges is in conformity with the following standards in accordance with the EMC Directive.

Low Voltage Directive 2006/95/EC
EN 60950

EMC Directive 2004/108/EC
EN 55022 Class A
EN 55024

Signature:.....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

CE

Signature:.....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

CE MARK FIRST AFFIXED DATE (11 March 2010)

Declaration of Conformity

We, manufacturer, **Hatteland Display AS,** Åmsosen, N-5578 Nedre Vats, Norway
declare under our sole responsibility that the JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD, HT MMC and HD MMC product ranges is in conformity with IEC 60945 4th (EN 60945:2002) and IACS E10 (where applicable)

HATTELAND®
DISPLAY

Declaration of Conformity

We, manufacturer, **Hatteland Display AS,** Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the products listed below comply with
FCC 47 CFR Part 15, Subpart B, Class A:

JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD,
HT STD, HD MMD, HM MMD, HT MMC and HD MMC product ranges.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Signature:.....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

FC

Signature:.....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

FCC MARK FIRST AFFIXED DATE (16 February 2012)

Return Of Goods Information

Return of goods:

(Applies not to warranty/normal service/repair of products)

Hatteland Display referenced as “manufacturer” in this document.

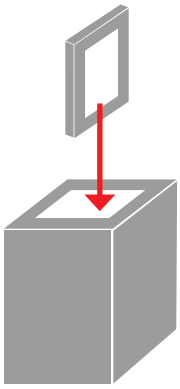
Before returning goods, please contact your system supplier before sending anything directly to manufacturer. When you return products after loan, test, evaulation or products subject for credit, you must ensure that all accessories received from our warehouse is returned. This applies to cables, powermodules and additional equipment except screws or similar, user manual, datasheets or other written paper documents. Furthermore, the product must not have any minor / medium or severe scratches, chemical spills or similar on the backcover, front frame or glass.

This is needed to credit the invoice 100%. Missing parts will not be subject for credit, and you will not get total credit for returned product. You will either be charged separately or the amount is withdrawn from the credit. If you decide to ship the missing items on the after hand, you will get 100% credit for that particular invoice or items received at manufacturer incoming goods control. Please contact our service/sales department if additional questions

Handling and packing units for return/credit

To prevent damage during shipping and transportation, respect the guidelines below.

Make sure you surround the product with the following material (whenever possible):



Use the original packaging from manufacturer, firm foam material, bubble wrap, lots of PadPack paper or foam chips/polyester wrapped in sealed plastic bags. Please make sure that the unit is protected with a surrounding plastic bag to prevent dust accumulation around the unit.

If you do not have the original packaging or are uncertain how to secure the unit properly, please consider seeking advice from nearby shipping or transportation offices, if in doubt!

Do not under any circumstances use loose foam chips, expanded polyester, clothes, cardboard with sharp edges/spikes, too little or nothing to secure the unit inside the box. Do not use cardboard boxes that are clearly too weak or not suitable for securing the unit properly during overseas shipment.

Terms Of Sale And Delivery

1) APPLICATION
The terms of sale and delivery apply for Hatteland Display.

2) PRICE
a) The price is per each, if nothing else has been stated, VAT not included. Price is based on the prices from our suppliers, current custom rates, taxes, rate of exchange and international raw material prices. We reserve ourselves the rights to adjustments in case of alternation on the above mentioned.

b) Included in the price is the supplier's standard packing. In case of re-packing/smaller quantities we reserve ourselves the right to add an additional sum for warrantable packing according to CECC 0015 (Basic inspection for protection of electrostatic sensitive devices)

3) VALIDITY
If nothing else has been stated in our quotation, the offer is valid for 30 days from the date of quotation.

4) PACKAGE QUOTATION
A package quotation means that all the components offered, must be ordered by us. If one component or more are removed from the quotation, the prices given in the package quotation are not valid.

5) TERMS OF PAYMENT
Cash on delivery or payment in advance. Net granted for companies, schools and institutions only, according to agreement. In case of too late payment 1.5% interest/month will be charged. Seller has mortage rights in the goods delivered until the purchase price, additional interests and charges have been paid in full. Accepted bill is not considered as payment until it has been honoured in full.

6) TIME OF DELIVERY
The quoted time of delivery is based on information from our suppliers. We disclaim any responsibility for the consequences of any delay or cancellation from our suppliers. Belated delivery gives not solely the right for cancellation.

7) DELIVERY POINT OF TIME
Goods are considered delivered to customer when handed over to charterer.

8) FREIGHT / PACKING / FORWARDING FEE
Hatteland Display charge NOK 50,- in forwarding fee for orders below NOK 1000,-.
Freight charge according to expenses for orders above NOK 1000,-. VAT not included.

9) COMPLAINT
By receipt customer must check goods for obvious defects which have to be claimed within 8 days from receipt. Otherwise acceptance of complaint can not be counted on.

10) WARRANTY / SERVICES
Time of warranty is calculated from our date of shipment, and applies to the extent that we are covered by our supplier's warranty regulations. The warranty does no longer apply if:

I) there has been encroached upon the goods without seller's consent
II) terms of payment is not fulfilled
III) the goods have been damaged due to unskilled treatment
IV) components which are sensitive for static electricity have not been unpacked and treated in a secure way.

Minimum requirements: CECC 00015's standards for handling of such components. The warranty does not include fair wear and tear.

11) RESPONSIBLITY
Seller undertake to deliver faultless and functional capable goods according to existing technical specifications. Seller disclaim responsibility for any damage or loss which directly or indirectly may be caused due to failure or defect with the delivered goods, if carelessness from the seller can be limited up to the cost of the goods. The supplier's responsibility for defects with the supplied goods do not include secondary damage or loss.

12) CANCELLATION / RETURN
Binding sales contract is concluded when we have confirmed customer's purchase order. Any disagreements in our order confirmation must be reported to seller within 6 days. The agreement can not be altered without our permission, after acceptance from our supplier. If goods are wanted to be returned, a Return No must be assigned from seller. Returned goods without a Return No will not be accepted. By return of stock listed goods, 20% return fee is charged. Returned goods are shipped on customer's account and risk.

13) LOAN, RENT and DEMO
When borrowing of goods for demo/test, the date of return must be added to the document. If no date has been stated, date of return is two weeks from the date of the document. Before return, seller must be contacted for a Return No (RMA). Goods which have been sold with an agreed right of return within stated terms, shall also have a Return No. The Return No must be obtained before the stated date of return. Returned goods without a Return No, or which have not been packed in original packing, will not be accepted.

14) LIMITATIONS
If any of our suppliers claim limited delivery terms towards us, our terms of delivery will be restricted according to those.

15) SOFTWARE
Sold or borrowed software is not allowed to be copied or spread in other ways, without a written permission.

16) RE-EXPORT
Goods delivered from seller may be subject to special rules of exportation in their supplier's native country. Buyer is responsible to obtain necessary permissions for further export/re-sale.

17) QUESTION IN DISPUTE
To settle any dispute the Karmsund Herredsrett is approved the legal venue.

INSTRUCTIONS FOR THE CONSIGNEE

1) CONTROL
Control the goods immediately by receipt. Examine the quantity towards the invoice/packinglist/shipping documents. Look for outward defects on the packing which may indicate damage on or loss of contents. Control the container and the seals for any defects.

2) SECURING EVIDENCE
When defects on the goods have been found, evidence must be secured, and seller must be informed. Call the transporter and point out the defects. Add a description of the defects on the goods receipt, the forwarder's copy of the way-bill or on the driving slip.

3) RESCUE
Bound the damage. Try to restrict the damage and the loss. Seller will compensate expences incurred due to reasonable security efforts in addition to damage and loss.

4) COMPLAINT
Write immediately a complaint to the transporter or his agent. Forward immediately the complaint to the transporter or his agent, and hold the transporter responsible for the defects. The complaint must be sent at the latest:

- for carriage by sea: within 3 days
- for overland / air transportation within 7 days

5) DOCUMENTATION
For any claims the following documentation is required, and must be forwared to the company or their agent: invoice, way-bill and/or bill of landing, and/or statement of arrival, inspection document, besides a copy of the letter of complaint to the transporter.

Pixel Defect Policy

PIXEL DEFECT POLICY

Dot-defects (Bright or dark spots on the panel)

Due to the effect that dot failures are part of the TFT technology such failure occurrence cannot be prevented basically. Even though dot defects usually occur during production process, new defects can appear within the lifespan of a TFT display. Neither the production at LCD-supplier nor the use of a LCD-Monitor after shipment can be influenced by Hatteland Display. Hence Hatteland Display cannot be made responsible for such dot failures. However Hatteland Display understand and accepts the responsibility towards the customers for the delivery of new displays, therefore accepts a limitation on dot defect's occurrence on new displays delivered to the customer.

PRINCIPLES

a. One pixel consists of 3 dots (Red, Green and Blue)

b. Dot defects are differentiated between:
- Bright dot defects: Spot on the panel appear as pixels or sub pixels that are always lit. Non-extinguishing dot.
- Dark dot defects: Spot on the panel appear as pixels or sub pixels that are always dark (off). Non-lightening dot.

c. Inspector observes the LCD from normal direction at a distance of 50cm above the worktable. Dark dots are counted under entire white screen. Bright dots are counted under entire black screen.

d. Dot failures within tolerances below do not qualify for warranty claims.

PIXEL DEFECT TOLERANCES

Bright dot	≤ 4 dots
Two adjacent bright dots *	≤ 2
Distance between 2 dot defects *	≥ 15mm
Dark dots	≤ 8
Total number of bright or dark dot defects. *	≤ 8

* 1 or 2 adjacent dot defects considered as 1 defect.

EXTRAORDINARY CIRCUMSTANCES

Possible cases which cannot be influenced either by customer or Hatteland Display.

Examples for extraordinary circumstances:
- Allocation from LCD-Supplier
- Outstanding high number of LCD-panels with bright dots but within LCD-suppliers Specification.
- Sharply increased demand by customer

In such cases a mutual agreement is inevitable.

Examples:
- Acceptance of bright dots in "non-critical" display areas.
- Acceptance of bright dots with defined color.

Last Revised July 2007

Notes

General Notes:

- The unit is type approved according to EN60945 4th, 4.4, equipment category b) protected from the weather.

- Other type approvals applies for the different products.
  Please see the appropriate “Specifications” page in this manual for more information.

- Use of brillance and Glass Display Control™ (touch key functions) may inhibit visibility of information at night.

- License Terms for the installed OEM Operating System (OS) can be found on root of main boot device,
  (typically “C:\” partition).

Note for units equipped with an PCTS (Projected Capacitive) Touch Screen:

Maritime Multi Computer (MMC, Panel Computer) uses internal USB connection and can be controlled by the Operating System (OS). So, in order to clean the glass without any touch screen movement being detected, you either have to shut down the Operating System (either via customized functions from within applications or by touching the Power On/Off symbol) to make sure the unit has been shut down before attempting to clean the glass surface.

To learn more about how to properly clean glass surfaces, review the “Ergonomics” section in the “General Installation Recommendations” chapter earlier in this manual.

User Notes

Revision History

Rev.	By	Date	Notes
0	BU SE	08 Nov 2011 23 Nov 2011	Release for internal review. Revised after internal review.
1	BU SE	06 Dec 2011	Released for internet/customers
2	SE	21 Dec 2011	Revise text about other models, page 15 Revised specifications, minor text changes page 22,24,25,26 Added datasheet for JH C01MF A-A, page 28 Added datasheet for CAN MODULE with CO-Processor, page 29
3	GOS BT BU AK SE	07 Mar 2012	Added note on frontpage for MxC models, page 1 Revised Contents of Package, added HD XXTBR STD-A1 mounting brackets and added note, page 5 Added note for handling products correctly (First Things First!), page 12 Added installation procedure for Panel Cutout / Console Mounting Bracket Kit for 24 inch, page 17 Added indication/illustration of optional NMEA COM module, page 18 Revised Specifications where needed (small text changes and cleanup), page 26-30 Added preliminary 26 inch drawings and specifications, page 31, 43 Added datasheet for COM Module PCA100293-1, (RS-422/RS-485, ECDIS/NMEA Compliant), page 33 Added datasheet for COM Module PCA100294-1 (RS-232), page 34 Added installation procedure for Key Hole Mounting Bracket Kit, page 16, page 46 Added Pin Out assignment for DC Power Input, page 52 Added Pin Out assignments for specific Series X connectors, page 52-55 Revised text for “Handling and packing units for return/credit”, page 58 Added FCC declaration, page 57
4	BU SE	14 Mar 2012	Removed numbering (COM1-4, COM3-6) and added instead note “configuration dependent”, page 33,34 Changed 250 cd/m2 to 300 cd/m2, page 30
5	AB SE	20 Apr 2012	Revised Console Mount Kit+Table Mount Bracket typenumbers (page 5,16,17,26,27,28,29,30,31,46,47,48)
6	AK SE	16 Aug 2012	Revised type approvals and remove MTBF data, page 26,27,28,29,30,31
7	AB SE	13 Nov 2012	Revised minor text elements throughout manual where needed Revised Contents of Package (Console Mounting kit now part of standard factory delivery), page 5 Added note about Full/Half duplex, page 55
8	BU SE	18 Jun 2013	Revised Contents of Package (connectors), page 5 Added General Touch Screen Info and labels page 10,11,12,13,14,15 Revised Product Labeling chapter, ref: QAR/117540, page 12,13,14,15 Added point 1. to Ergonomics section, cleaning, page 21 Added section “Installation limitations”, page 19,20 Revised point 7 in General mounting instructions, grounding, page 20 Added Housing Connector overview, page 23,24 Added Installation procedures for HD TMB SX1-C1 and HD 19BRD SX1-A1, page 27,28,29 Added note for USB1.1 (12mbps) port, page 31 Revised “Expansion Area for modules” table, page 33 Added Accessory (External Module Box) for: - HT 00262 OPT-A1 (NMEA COM), HT 00263 OPT-A2 (COM), HT 00264 OPT-A1 (CAN) and - HT 00273 OPT-A1 (DIO)), page 40,41,42,43,44,45,68,69 Added High Bright specifications for 17, 19 and 24 inch, page 42,43,44 Added 26” LED Backlight spec, page 45 Added illustration and revised datasheet for HT 00254 OPT-A1, CAN isolated module, page 46 - Reference: http://www.hatteland-display.com/mails/06_2013_ecn.html Added factory option, Digital Input/Output module (HT 00268 OPT-A1), page 49,50,80 Revised datasheet for PCA100293-1, COM Module RS-422 / RS-485, page 47 Added datasheet for External Module USB (CAN/COM/DIO), page 53,54 Added SSD Selection Guide, page 70,71,72 Added pinout assignments for PCA100294-1 (COM Module RS-232), page 77 Added note for PCA100293-1 (RS-485 Half Duplex (2-wire) Configuration), page 79 Added note for PCTS (Projected Capacitive) Touch Screen, page 87 Added note for “License Terms OEM OS”, page 87